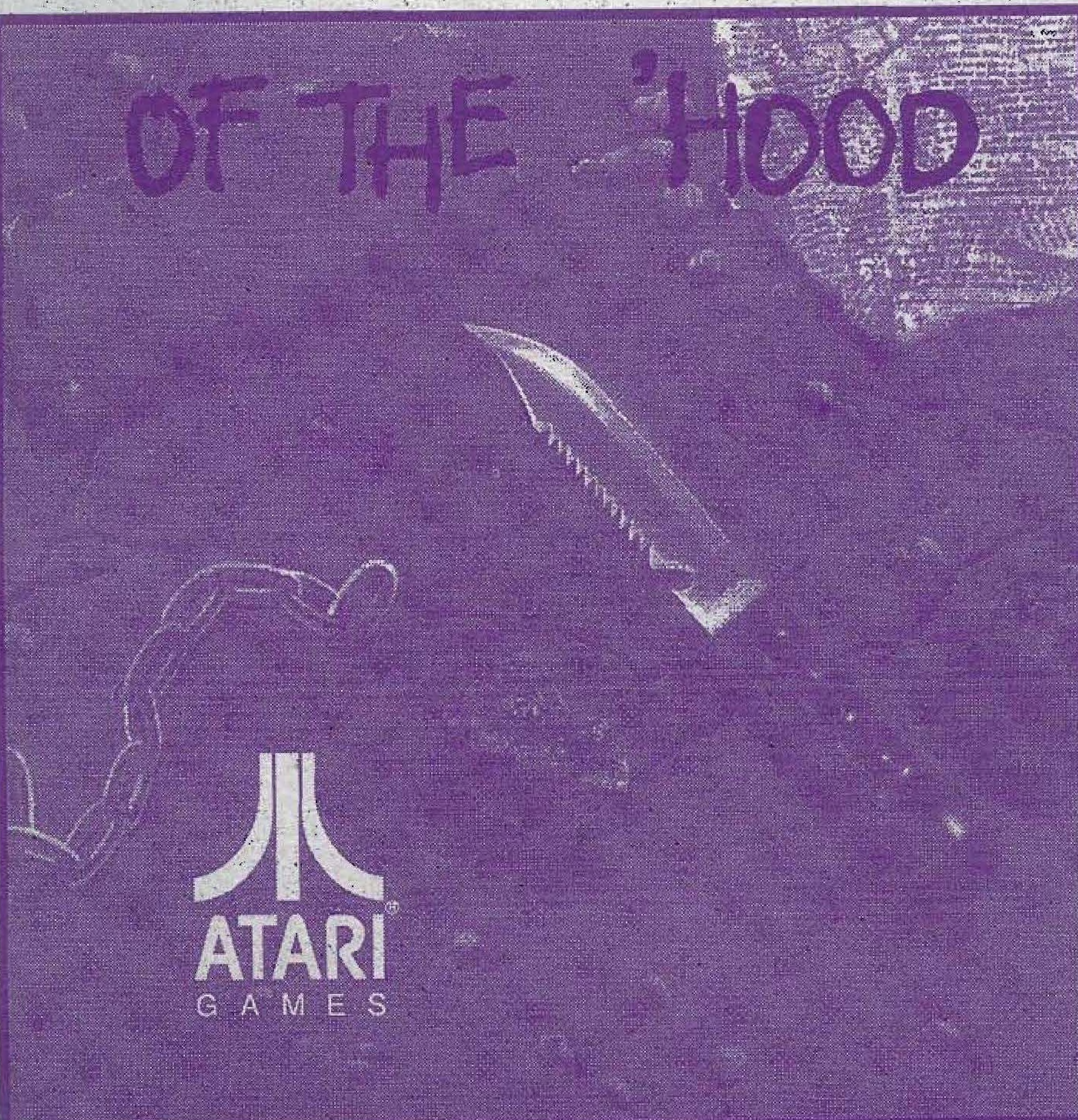


GUARDIANSTM

OF THE 'HOOD



OPERATOR'S

MANUAL

For technical assistance:

If reading through this manual does not lead to solving your game maintenance or repair problem, call TELE-HELP® at one of these Atari Games Customer Service offices:

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Atari Games Corporation
California Customer Service Office
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Milpitas, CA 95036-1110
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Telex 5101007850
Ⓢ (408) 434-3950

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Atari Games Ireland Limited
European Customer Service Office
Tipperary Town, Ireland
Fax 062-51702
Telex 70665
Ⓢ 062-52155

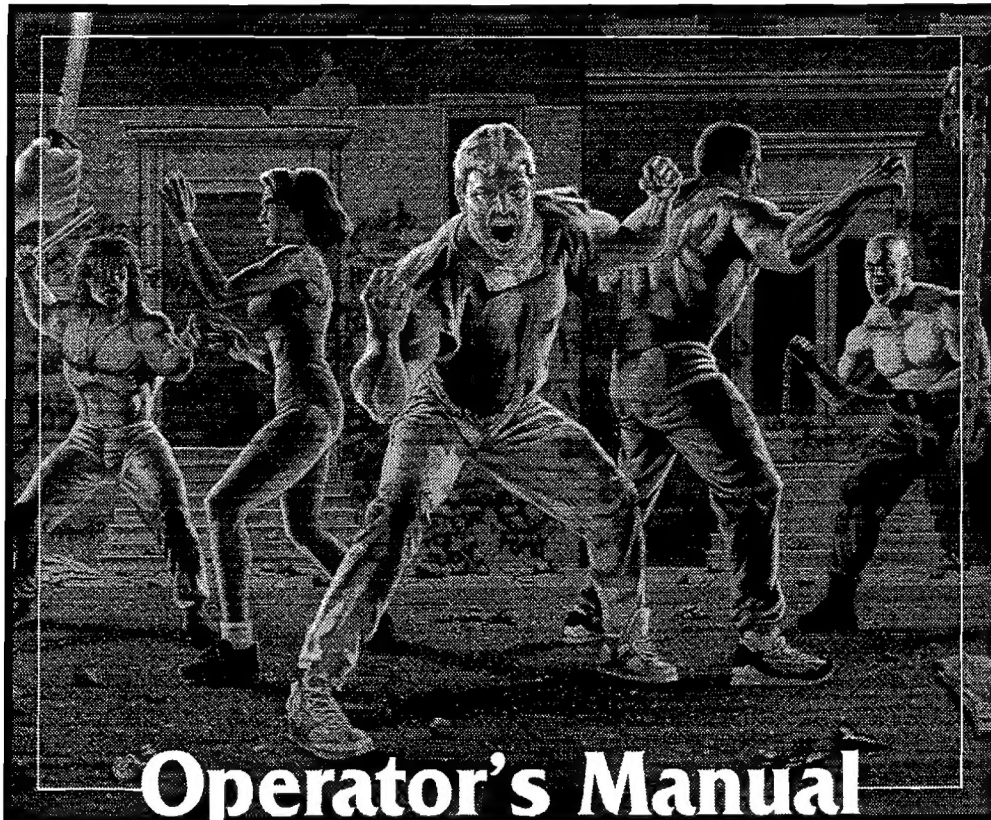
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GUARDIANS™

OF THE 'HOOD



with Schematics



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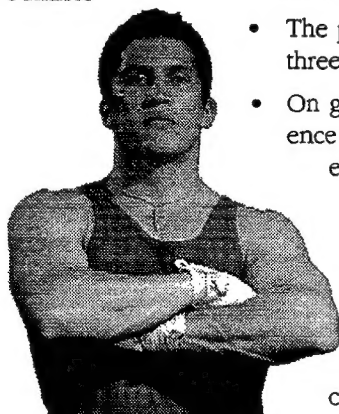
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NOTICE RE. NON-ATARI[®] PARTS

WARNING

Use of non-Atari parts or modifications of any Atari game circuitry may adversely affect the safety of your game, and may cause injury to you and your players.

You may void the game warranty (printed on the inside back cover of this manual) if you do any of the following:

- Substitute non-Atari parts in the game.
- Modify or alter any circuits in the game by using kits or parts *not* supplied by Atari Games Corporation.

NOTE

This equipment generates, uses, and can radiate radio frequency energy, and if not installed and used in accordance with the instruction manual, may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device pursuant to Subpart J of Part 15 of Federal Communications Commission (FCC) Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area or modification to this equipment is likely to cause interference, in which case the user, at his own expense, will be required to take whatever measures may be required to correct the interference. If you suspect interference from an Atari game at your location, check the following:

- All ground wires in the game are properly connected as shown in the game wiring diagram.
- The power cord is properly plugged into a grounded three-wire outlet.
- On games provided with an Electromagnetic Interference (EMI) ground plane, be sure that the game printed-circuit boards (PCBs) are properly installed on the EMI ground plane and that the end board is securely installed with **all** screws in place and tightened.

If you are still unable to solve the interference problem, please contact Customer Service at Atari Games Corporation. See the inside front cover of this manual for service in your area.

S A F E T Y S U M M A R Y

The following safety precautions apply to all game operators and service personnel. Specific warnings and cautions will be found in this manual whenever they apply.

WARNING

Properly Ground the Game. Players may receive an electrical shock if this game is not properly grounded! To avoid electrical shock, do not plug in the game until it has been inspected and properly grounded. This game should only be plugged into a grounded three-wire outlet. If you have only a two-wire outlet, we recommend you hire a licensed electrician to install a three-wire grounded outlet. If the control panel is not properly grounded, players may receive an electrical shock! After servicing any part on the control panel, check that the grounding wire is firmly secured to the control panel. After you have checked this, lock up the game.

AC Power Connection. Before you plug in the game, be sure that the game's power supply can accept the AC line voltage in your location. The line voltage requirements are listed in the first chapter of this manual.

Disconnect Power During Repairs. To avoid electrical shock, disconnect the game from the AC power before removing or repairing any part of the game. If you remove or repair the video display, be very careful to avoid electrical shock. High voltages continue to exist even after power is disconnected in the display circuitry and the cathode-ray tube (CRT). Do not touch the internal parts of the display with your hands or with metal objects! Always discharge the high voltage from the CRT before servicing it. Do this after you disconnect it from the power source. First, attach one end of a large, well-insulated, 18-gauge jumper wire to ground. Then momentarily touch the free end of the grounded jumper wire to the CRT anode by sliding the wire under the anode cap. Wait two minutes and do this again.

Use Only Atari Parts. To maintain the safety of your Atari game, use only Atari parts when you repair it. Using non-Atari parts or modifying the game circuitry

may be dangerous, and could injure you and your players.

Handle the CRT With Care. If you drop the CRT and it breaks, it may implode! Shattered glass from the implosion can fly six feet or more.

Use the Proper Fuses. To avoid electrical shock, use replacement fuses which are specified in the parts list for this game. Replacement fuses must match those replaced in fuse type, voltage rating, and current rating. In addition, the fuse cover must be in place during game operation.

CAUTION

Properly Attach All Connectors. Make sure that the connectors on each printed circuit board (PCB) are properly plugged in. The connectors are keyed to fit only one way. If they do not slip on easily, do not force them. If you reverse a connector, it may damage your game and void your warranty.

Ensure the Proper AC Line Frequency. Video games manufactured for operation on 60 Hz line power (used in the United States) must not be operated in countries with 50 Hz line power (used in Europe). If a 60 Hz machine operates on 50 Hz line power, the fluorescent line ballast transformer will overheat and cause a potential fire hazard. Check the product identification label on your machine for the line frequency required.

ABOUT NOTES, CAUTIONS, AND WARNINGS

In Atari publications, notes, cautions and warnings have the following meaning:

NOTE — A highlighted piece of information.

CAUTION — Equipment and/or parts can be damaged or destroyed if instructions are not followed. You will void the warranty on Atari printed-circuit boards, parts thereon, and video displays if equipment or parts are damaged or destroyed due to failure of following instructions.

WARNING — Players and/or technicians can be killed or injured if instructions are not followed.

CONTENTS

1 Set-Up

How to Use This Manual	1-1
Operating the Game	1-2
Inspecting the Game	1-2
Control and Switch Locations	1-2
Installing the Control Panel.....	1-3
Setting the Coin and Game Options.....	1-3
Game Play	1-3

2 Self-Test

Entering and Exiting the Self-Test.....	2-2
RAM and ROM Test	2-2
Select Test Menu	2-3
Switch Test	2-3
Volume Adjust	2-3
Sound Test	2-3
Coin Options.....	2-4
Game Options.....	2-5
Game Statistics	2-5
Alphanumeric Test	2-6
Motion Object Test	2-7
Playfield Test	2-7
Color Test.....	2-8
Convergence Test.....	2-8

3 Troubleshooting and Maintenance

Maintaining the Coin Mechanism	3-3
Repairing the Video Display	3-3
Repairing and Replacing the Joystick Control	3-6
ROMs and RAMs	3-6

4 Parts Illustrations

Part Ordering Information 4-1
For figure and page numbers, see the List of Illustrations that follows.

5 Schematics

See the List of Illustrations that follows.

Statistics Sheet

After the end of Chapter 5

Warranty

Inside back cover



ILLUSTRATIONS

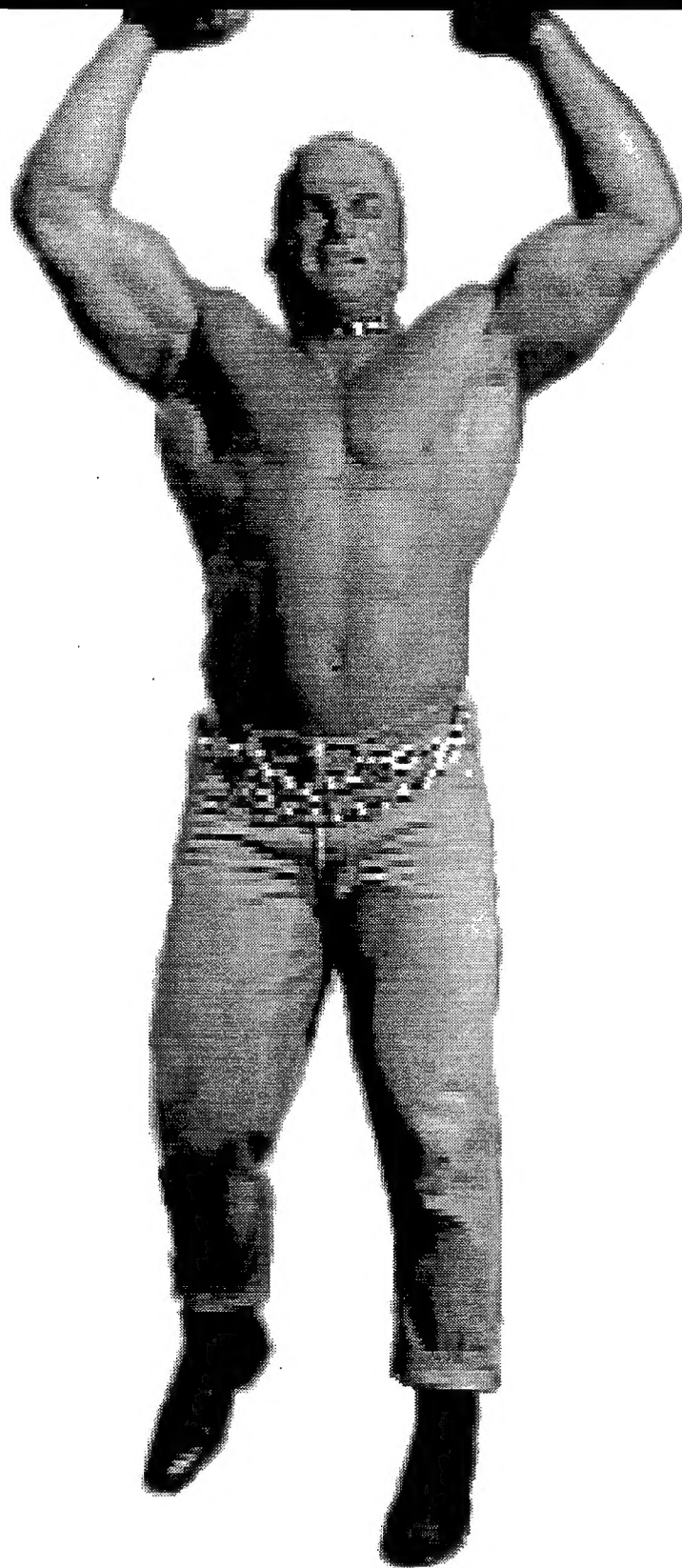
Figure 1-1	Self-Test Switch Locations	1-3
Figure 2-1	Select Test Menu Screen.....	2-3
Figure 2-2	Switch Test Screen.....	2-3
Figure 2-3	Volume Adjust Screen.....	2-3
Figure 2-4	Sound Test Screen	2-3
Figure 2-5	Coin Options Screen	2-4
Figure 2-6	Game Options Screen	2-5
Figure 2-7	Statistics Screen.....	2-5
Figure 2-8	Alphanumeric Test Screen	2-7
Figure 2-9	Motion Object Test Screen.....	2-7
Figure 2-10	Playfield Test Screen.....	2-7
Figure 2-11	Color Test Screen.....	2-7
Figure 2-12	Convergence Test Screen	2-8
Figure 3-1	Maintaining the Joystick Assembly	3-5
Figure 4-1	Cabinet-Mounted Assemblies.....	4-2
Figure 4-2	Control Panel Assembly	4-4
Figure 4-3	Joystick Assembly	4-5
Figure 4-4	Coin Controls, Inc. Coin Door Assembly	4-6
Figure 4-5	Power Supply Assembly.....	4-9
Figure 4-6	Guardians of the 'Hood Game PCB Assembly	4-10
Figure 4-7	JSA Audio III PCB Assembly.....	4-16
Figure 5-1	Guardians of the 'Hood Game PCB Assembly Schematic Diagram.....	5-2
Figure 5-2	Hitron 5V, 7A Switching Power Supply Schematic Diagram	5-7
Figure 5-3	Peter Chou Power Supply Schematic Diagram (optional)	5-7
Figure 5-4	JSA Audio III PCB Assembly Schematic Diagram.....	5-8
Figure 5-5	Game Main Wiring Diagram	5-14
Figure 5-6	Over/Under Coin Door Wiring Diagram.....	5-16
Figure 5-7	JAMMA Power Supply Wiring Diagram.....	5-16

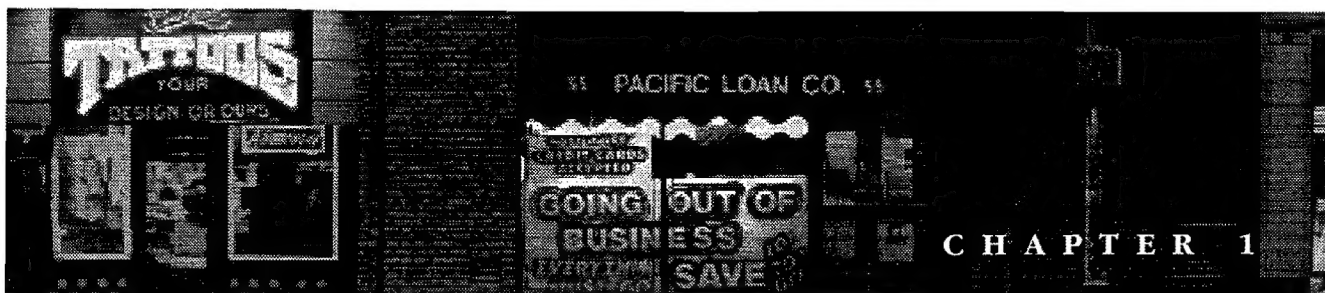
TABLES

Table 1-1	Game Specifications	1-2
Table 2-1	Summary of All Self-Test Screens	2-2
Table 2-2	Bad RAM Location by Error Address...	2-2
Table 2-3	Bad ROM Location by Error Address...	2-2
Table 2-4	Coin Option Settings	2-4
Table 2-5	Game Option Settings	2-5
Table 3-1	Troubleshooting Table.....	3-2
Table 3-2	Voltage Inputs and Test Points on the PCBs.....	3-3
Table 3-3	What ROM Problems Look Like.....	3-4
Table 3-4	Screen Colors Indicating Bad RAMs	3-4



NOTES

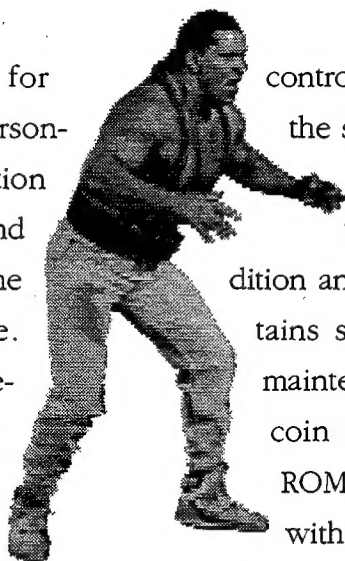




Set-Up

How to Use This Manual

THIS MANUAL IS written for operators and service personnel. It provides information for setting up, playing, testing, and maintaining your Guardians of the 'Hood™ (neighborhood) game. Guardians of the 'Hood is a one- or two-player fighting game with two sets of controls and 3-D digitized video. The game provides photographically real views of a seedy inner city. ☆ Chapter 1 contains set-up and game play information. ☆ Chapter 2 contains a description of the self-test procedures. The self-test is important in the Guardians of the 'Hood game. You can troubleshoot the PC boards, main circuits, and



controls using the more than 11 screens in the self-test. You should regularly test the boards and controls with the self-test to keep your game in peak condition and at top earnings. ☆ Chapter 3 contains several troubleshooting tables, plus maintenance and repair procedures for the coin mechanism, video display, joystick, ROMs and RAMs. If you have problems with your game, use this chapter to troubleshoot and to repair it. Be sure to perform the preventive maintenance tasks to keep your game in good condition. ☆ Chapter 4 contains the illustrations and PCB parts lists. ☆ Chapter 5 contains the schematics for the game and audio PCBs and the game wiring diagram.

Operating the Game

To operate your game for maximum income, you should regularly do the automated self-test and check the controls with the *Control Inputs* screen in the self-test. By using the self-test regularly, you can find and fix problems immediately. This lets you keep your game in top condition.

Inspecting the Game

WARNING

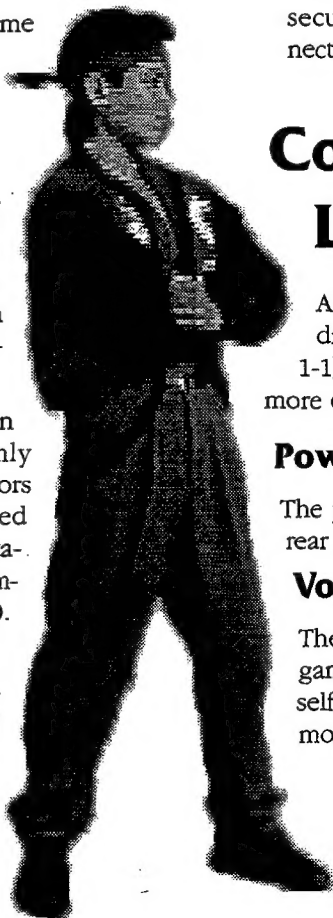
To avoid electrical shock, do not plug in the cabinet until it has been properly inspected and set up for the line voltage in your area.

This cabinet should be connected to a grounded three-wire outlet only. If you have only two-wire outlets, we recommend that you hire a licensed electrician to install grounded outlets. Players can receive an electrical shock if the cabinet is not properly grounded.

Inspect your Guardians of the 'Hood game carefully to ensure that the game is complete and was delivered to you in good condition.

Inspect the cabinet and seat as follows:

1. Examine the exterior of the cabinet for dents, chips, or broken parts.
2. Open the upper and lower rear access panels. Unlock and open the coin doors. Inspect the interior of the cabinet as follows:
 - a. Check that all plug-in connectors on the cabinet harnesses are firmly plugged in. Do not force connectors together. The connectors are keyed so they fit only in the proper orientation. A reversed connector can damage a printed-circuit board (PCB). This will void your warranty.
 - b. Ensure that all plug-in integrated circuits on each PCB are firmly plugged into their sockets.
 - c. Inspect the power cord for any cuts or dents in the insulation.
 - d. Inspect the power supply. Make sure that the correct fuses are in-



Characteristic	Specification
Power Consumption	150 W maximum
Line Fuse Rating	3 Amps
Line Voltage	102 to 132 VAC
Temperature	5° to 38° C (37° to 100° F)
Humidity	Not to exceed 95% relative
Width	33.25 inches (84 cm)
Depth	38.25 inches (97 cm)
Height	71.75 inches (182 cm)
Weight	325 lbs. (148 kg)

Table 1-1 Game Specifications

stalled. Check that the harness is plugged in correctly and that the fuse block cover is mounted in place. Check that the green ground wires are connected.

- e. Inspect other sub-assemblies, such as the video display, controls, printed-circuit boards (PCBs), and speakers. Make sure that they are mounted securely and that the ground wires are connected.

Control and Switch Locations

All of the controls are located inside the drawer or behind the coin doors (see Figure 1-1). The following describes the locations in more detail:

Power On/Off Switch

The power on/off switch is located at the upper rear panel of the cabinet, above the rear door.

Volume Control

There is no volume adjustment knob on this game's PCB. Instead, volume is adjusted in the self-test. Refer to Chapter 2 of this manual for more information.

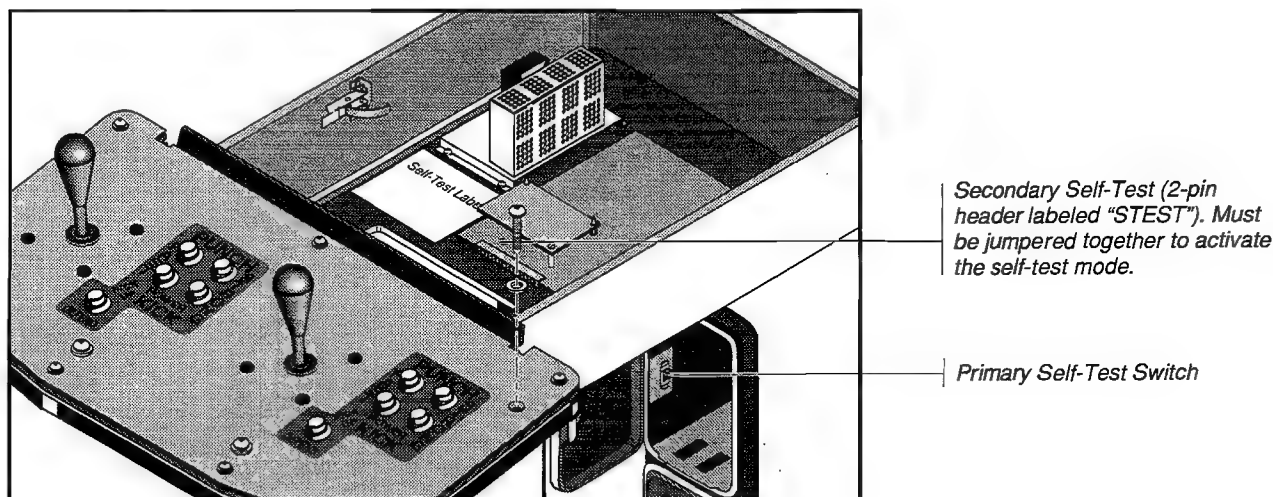


Figure 1-1 Self-Test Switch Locations

Self-Test Switch

The primary self-test switch is conveniently located inside the upper coin door (inside the left edge of the opening).

Coin Counter

The coin counter is located on the bottom right edge of the coin box, inside the lower coin door.

Installing the Control Panel

Make sure the game power is turned off. To install the separately packaged control panel, you need the following tools:

- Hex driver or wrench
 - Four flat washers (provided with game)
 - Four nut/washer assemblies (provided with game)
1. Reach in through the openings on the front of the drawer, and open the spring draw latch on each side. Pull the drawer out partly (see Figure 1-1).
 2. Hold the control panel up to the front of the drawer, and match up the four threaded studs with the four small holes (one in each corner).

3. Install one flat washer and nut/washer assembly onto each threaded stud.
4. Plug the two control panel harness connectors into the game harness inside the drawer. These connectors are keyed, so you should be able to determine which ones connect together.
5. Close the drawer and snap shut both latches.
6. Turn on the game power. Check that the video display and the attraction lamp have power.

Setting the Coin and Game Options

The Guardians of the 'Hood coin and game options are set in the self-test. Refer to Chapter 2 for the recommended settings and the procedure for setting the options.

Game Play

This section describes the features and play of the Guardians of the 'Hood game.

Introduction

The place is Center City. An escalating crime rate has converted a once-peaceful town into a seedy hangout for gangs and hoodlums.

Three gangs have taken over the town — the Dreads, the Shavers, and the Dragons. Each gang has an evil boss that rules over them. The plan for the Guardians of the 'Hood is to break up the gangs and convert the bosses to their side. Only this way can they turn the tide and regain the city. In the end, the secretive "Mr.. Big" unveils his true identity, that will surely surprise every player.

The local gym has become a meeting spot for a band of young citizens called the Guardians of the 'Hood. Here they work out and train with each other to keep their fighting skills razor sharp and instincts cat-like keen. Each could be registered as a lethal weapon, and united their fires burn hotter than boiling lava and pump up to the strength of one hundred men.

Game Characters

The characters in Guardians of the 'Hood are:

- **CONNER** — An all-around good fighter. Trained in both boxing and Karate, he possesses amazing quickness for his size. Graduating with honors from Center City University in medicine, he is considered the most eligible bachelor of the town.
- **CHIEF** — Tough as a truck and the size of three men. After losing his family in a battle between two rival gangs, he pledged to bring back peace to the city. He is so devoted to the cause, that he passed up a multi-million-dollar football offer.
- **TANYA** — She is the tall statuesque cat. When not securing the peace in Center City, she can be found

adorning the covers of major fashion magazines. Her father's duty in Special Forces influenced her interest in the martial arts. She possesses black belts in Tai-Chi, Tae Kwon Do, and Kung Fu.

- **JAVIER** — He is a gold-medal winner in kickboxing. His natural speed and agility aided his ability to be a multi-sport athlete. After the Guardians of the 'Hood clean up the city, he plans to return to his shortstop position on the Center City Bashers.

Game Play

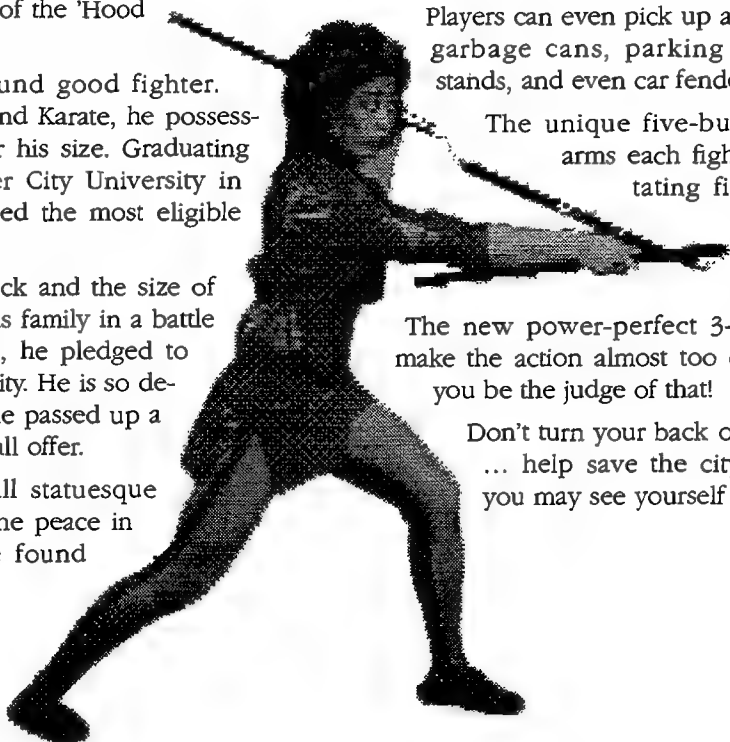
Guardians of the 'Hood is a two-player game full of hard-hitting action. Players wage the war against crime with four powerful fighters. As players punish rival gang bosses and convert them to their side, the selection of player characters increases. There's seven in all! From closed-in Gym Waves to wide-open street scenes, Guardians of the 'Hood gives players the best of both worlds ... head-to-head and side-scrolling game play. Meet head-on with gangs who make bad streets, back alleys, and subway stations their domain to prey on the weak!

Players can even pick up and use street junk like garbage cans, parking meters, newspaper stands, and even car fenders!

The unique five-button/joystick control arms each fighter with many devastating fighting moves. There are lots of hidden moves for players to discover!

The new power-perfect 3-D digitized graphics make the action almost too close for comfort! But you be the judge of that!

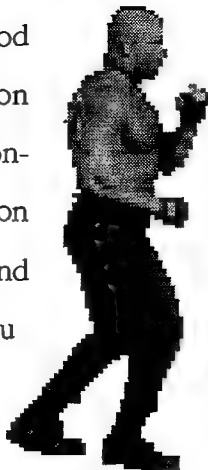
Don't turn your back on those that need you ... help save the city! Who knows, hero, you may see yourself on the front page!



Self-Test

Introduction

USE THE Guardians of the 'Hood self-test to check the condition of the game circuitry and controls. You will see the self-test information on the video display and hear the sound test information through the speakers. You do not need any additional equipment to perform the self-test. Perform the



self-test when you first set up the game, each time you collect the money, or when you suspect game problems. This chapter shows the screens in the self-test and explains each of the tests. The screens and explanations are arranged in the order they appear in the self-test. Table 2-1 lists all the self-test screens.

Entering and Exiting the Self-Test

This game has two self-test switches. The primary one is conveniently located inside the upper coin door (inside the left edge of the opening). The secondary self-test switch is located on the JSA Audio III PCB, in the drawer behind the control panel.

To enter the self-test, turn on the self-test switch inside the upper coin door. Doing so displays the Select Test menu (entitled “Self Test”); see Figure 2-1. Exit the self-test by turning off the self-test switch at any time.

RAM and ROM Test

When you turn on the power, the game automatically runs through the random-access memory (RAM) and read-only memory (ROM) test. This test is not part of the self-test procedure. Regardless of whether or not the game has a problem, it will always advance to the attract mode. The game will stop only if you power it

up and the self-test switch has been previously turned on.

Game RAM Test

No message appears while the test is checking the RAMs. If more than 30 seconds elapse and the self-test menu doesn't appear, the game has a problem. See Table 2-2 for the locations of bad RAMs. If the test finds no RAM errors, no message appears and the program goes to the ROM test after 15–20 seconds.

Game ROM Test

If the test finds no ROM errors, no message appears and the program goes to the title screen in the attract mode. If a ROM fails, a message is displayed. Furthermore, if the failed ROM is a program ROM, then the error number with checksums is shown in the center of the screen. The ROM error test takes a few seconds. See Table 2-3 for the location of bad ROMs.

If you think you have a ROM error, but the screen shows no messages, see Table 3-3 for information about the locations of various ROM functions.

Depending on how bad the ROM error is, you may not be able to enter the self-test.

Select Test Menu

Choose which test or screen you want to see from this menu, shown in Figure 2-1. Move up and down the menu using any joystick. Start the selected test by pressing any Defend button.

Self Test (Select Test Menu)
Switch Test
Volume Adjust
Sound Test
Coin Options
Game Options
Game Statistics
Alpha(numeric) Test
Motion Object Test
Playfield Test
Color Test
First Color Test
Second Color Test
Red Color Purity
Green Color Purity
Blue Color Purity
White Color Purity
Grey Color Purity
Convergence Test
White Convergence
Violet Convergence
Blue Convergence
Yellow Convergence

Table 2-1 Summary of All Self-Test Screens

Error Address	RAM Location	
	High	Low
FE8000 (Color RAM)	3C	2C
FF0000 (Video RAM)	17N	15N

Table 2-2 Bad RAM Location by Error Address

Error Address	ROM Location	
	High	Low
000000	8D	8C
020000	9D	9C

Table 2-3 Bad ROM Location by Error Address

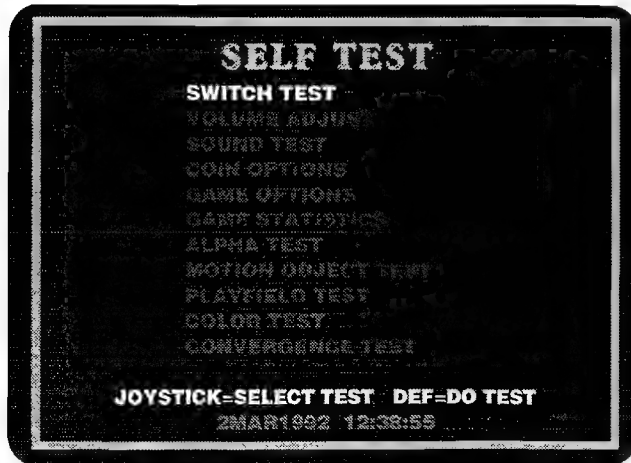


Figure 2-1 Select Test Menu Screen

Switch Test

The switch test screen for a two-player game is shown in Figure 2-2. Test the joysticks and pushbutton switches. As you use each control, the pink Xs for the pushbuttons change to Os, or the joystick switch markers (small yellow dots) are highlighted. If the changes do not appear on the screen, check the switch wiring and the switches.

NOTE

The coin mechanisms are checked in the Sound test. See the section that follows.

Press the Punch and Kick buttons simultaneously to return to the select test menu.

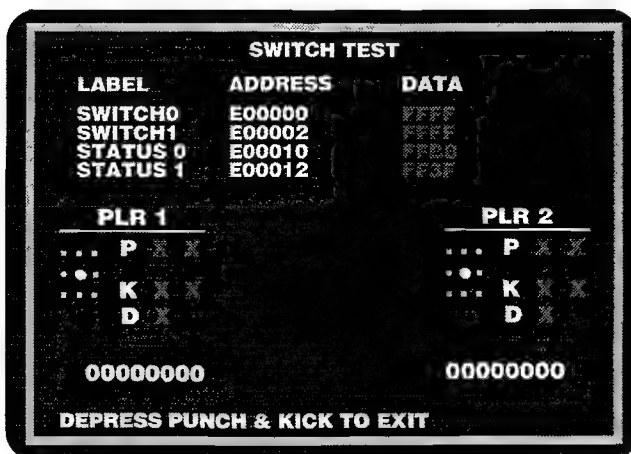


Figure 2-2 Switch Test Screen

Volume Adjust

Adjust the volume of the game using this screen, shown in Figure 2-3. Follow the instructions at the bottom of the screen to change the volume, to restore the old volume level, and to save the new volume and return to the select test menu.

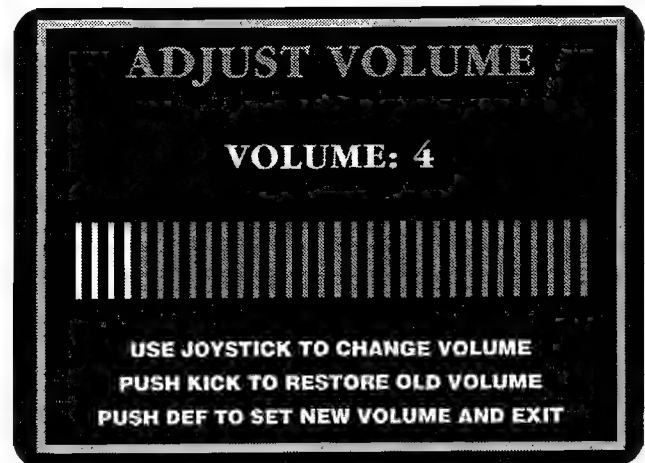


Figure 2-3 Volume Adjust Screen

Sound Test

The sound test indicates the condition of the sound effects circuit on the game PCB. The sound test screen appears in Figure 2-4.

Use one of the joysticks to select from the sounds; press one of the Punch buttons to listen to it. (You can have numerous sounds playing simultaneously, or you

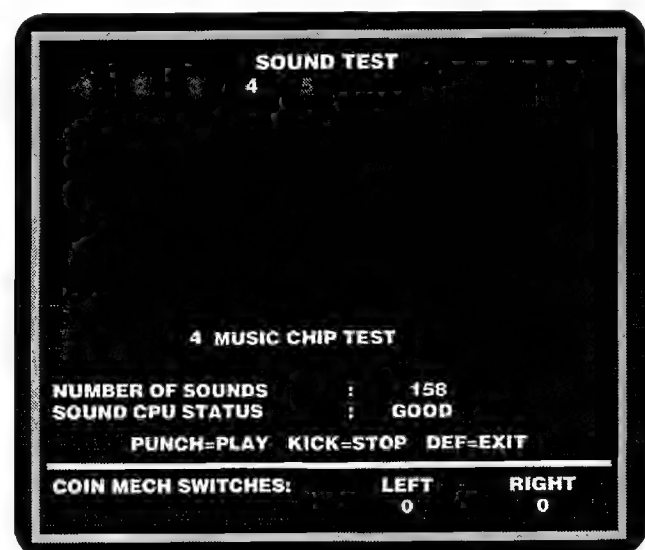


Figure 2-4 Sound Test Screen

Option	Available Settings	Explanation
Free Play	No <input checked="" type="checkbox"/> Yes	Lets you choose free play to demonstrate the game.
Discount to Continue	No <input checked="" type="checkbox"/> Yes	If set to Yes, this option reduces by 50% the player's cost to continue a game (always rounded up to the next full coin).
Game Cost	1 coin 1 credit <input checked="" type="checkbox"/> 2 coins 1 credit ... 8 coins 1 credit	The number of coins required for one credit.
Bonus for Quantity Buy-in	None <input checked="" type="checkbox"/> 2 coins give 1 3 coins give 1 3 coins give 2 4 coins give 1 ... 9 coins give 2 9 coins give 3	Lets you choose from various kinds of bonuses or no bonus.
Right Mech Value	1 coin counts as 1 coin <input checked="" type="checkbox"/> 1 coin counts as 2 coins ... 1 coin counts as 7 coins 1 coin counts as 8 coins	The number of coins each coin counts as in the right coin mechanism.
Left Mech Value	1 coin counts as 1 coin <input checked="" type="checkbox"/> 1 coin counts as 2 coins ... 1 coin counts as 7 coins 1 coin counts as 8 coins	The number of coins each coin counts as in the left coin mechanism.

☒ Manufacturer's recommended settings

Table 2-4 Coin Option Settings

can have silence, depending on which ones you select.) Pressing any Defend button returns you to the select test menu.

Coin Options

Check and select the coin options on this screen, shown in Figure 2-5. The screen shows the factory default settings in green.

To move through the options, to change or save the settings, or to return to the select test menu, follow the instructions shown at the bottom of the screen. The coin option settings, with defaults, are shown and explained in Table 2-4.

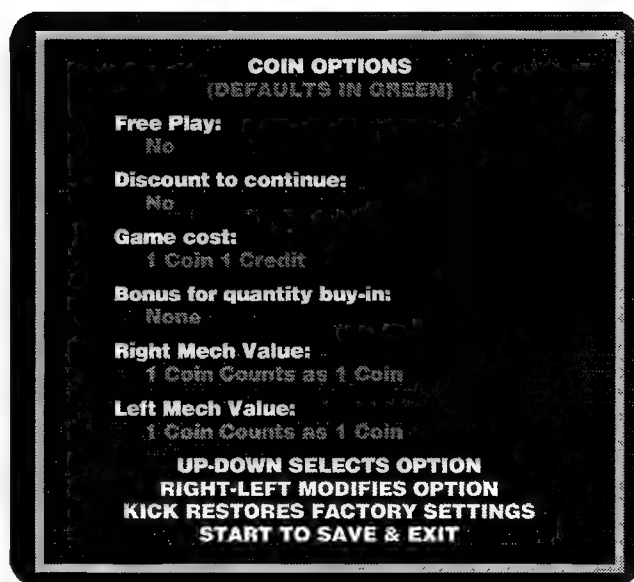


Figure 2-5 Coin Options Screen

Option	Available Settings		Explanation
Difficulty Level	Scale of 1 to 8 (where 1 = Easy and 8 = Hard) 5 ✓		Sets the game difficulty.
Music in Attract (Mode)	Yes ✓	No	Lets you turn the sound on or off in the attract mode.
Cabinet Configuration	Two-Player ✓	Three-Player	Sets the number of players who can use the game.
Auto Clear High Scores	Yes ✓	No	Automatically clears the high score table periodically.
Clear High Scores Now	Yes	No ✓	Immediately clears the high score table in the self-test.
Display EPA Screen	Yes ✓	No	Periodically displays the U.S. Environmental Protection Agency (EPA) emblem and the message "Recycle, Don't Trash It!" in the attract mode. If this game is used outside of the U.S., we recommend you set this option to "No."

✓ Manufacturer's recommended settings

Table 2-5 Game Option Settings

Game Options

Check and select the game options on this screen, shown in Figure 2-6. The screen shows the factory default settings in green.

To move through the options, to change or save the settings, or to return to the select test menu, follow the instructions shown at the bottom of the screen. The game options, with defaults, are shown and explained in Table 2-5.

Game Statistics

Use the information shown in the four statistics and histogram (bar graph) screens to keep track of your game use and maximize your profits. Record the information on the Guardians of the 'Hood statistics page in the back of this manual. The first of the screens is shown in Figure 2-7.

The game statistics are collected from the last time the statistics were cleared. You can clear the statistics by pressing the Punch button. Press any Defend button to advance to the next statistics or histogram screen, or to go back to the select test menu.

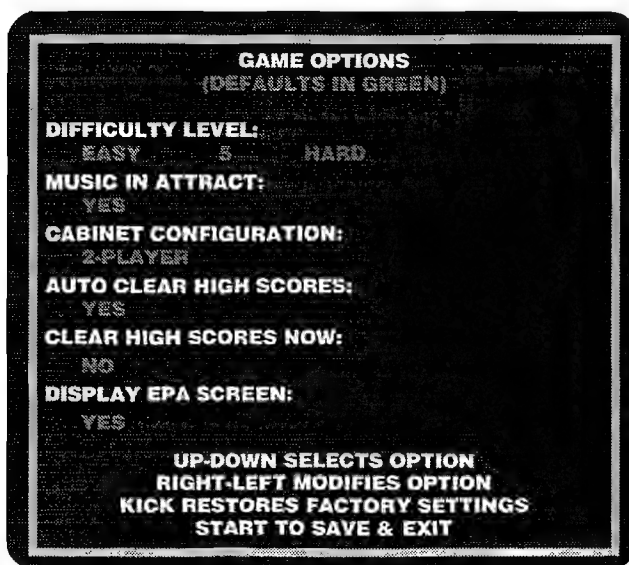


Figure 2-6 Game Options Screen

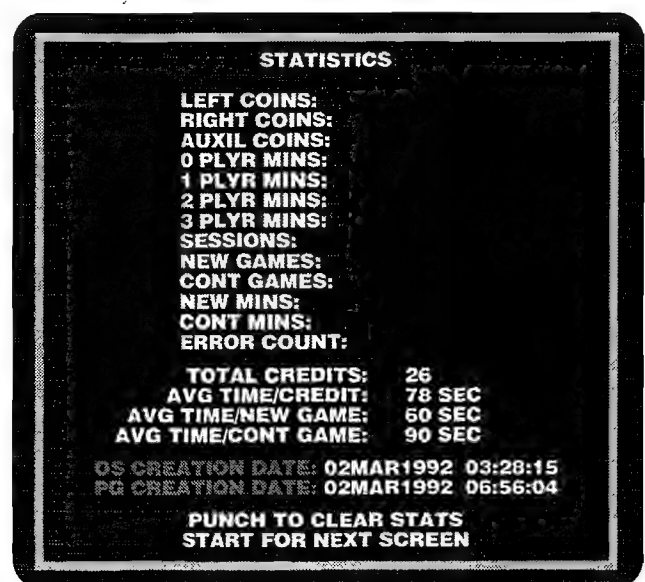
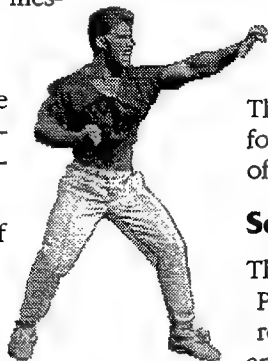


Figure 2-7 Statistics Screen

First Statistics Screen

The first statistics screen lists the following information:

- Left Coins shows the number of coins counted in the left coin mechanism.
- Right Coins shows the number of coins counted in the right coin mechanism.
- Auxiliary Coins shows the number of coins counted on the auxiliary service coin inputs.
- 0 Plyr Mins shows the number of minutes that the game was idle.
- 1 Plyr Mins shows the number of minutes that the game was played by one person only.
- 2 Plyr Mins shows the number of minutes that the game was played by two people.
- Session is measured from when the first player starts a game until the *Game Over* message appears.
- New Games shows the number of unique games played. A unique game is counted every time a player starts a new game (not a continued game).
- Cont Games shows the number of games that players continued.
- New Mins shows the number of minutes that the game was played as new games.
- Cont Mins shows the number of minutes that the game was played as continued games.
- Error Count shows the number of errors counted in the erasable memory. If you have an error count, the statistics may be wrong. If you consistently have errors counted for several weeks, replace the EEROM at 30E on the Guardians of the 'Hood game PCB.
- Total Credits is the number of credits accumulated by the game.
- Average Time per Credit is displayed in seconds. This item is tabulated for all games played since the statistics were cleared. If there are no credits, this line will not be displayed.
- Average Time per New Game is also displayed in seconds.
- Average Time per Continued Game is also displayed in seconds.



Statistics 2 Screen

The next statistics screen (titled "Round Counts and Average Times") lists the locale of each round. After the 13 locales, the screen shows how many players achieved those rounds and their average times playing those rounds.

New Game Time Screen

The next statistics screen (titled "New Game Time in Seconds") lists the length of time for all new games, grouped in 20-second increments (except for the shortest games lasting 0–39 seconds).

Continuation Game Time Screen

The next statistics screen (titled "Continuation Game Time in Seconds") lists the same information as the previous screen, except for continued games.

Session Time Screen

The next statistics screen (titled "Session Time in Minutes") lists how long each session lasted.

The bottom of the screen displays the median point for all session times. The median point represents half of all players above this point and half below.

Segment Screen

The next statistics screen (titled "Segment at Which Player Quit") lists which game segments players reached. The bottom of the screen displays the median point for all attained game segments.

Wave 1–4 Screens

The remaining four statistics screens (titled "Who's the most popular — Wave 1–4") lists which characters were most often chosen by players at the start of each wave.

Alphanumeric Test

The alphanumeric test, shown in Figure 2-8, checks the condition of the alphanumerics in the game. If you see an error on the screen, check the EPROM at 15L. Moving any of the joysticks up or down scrolls the screen up and down. Press any Defend button to go to the select test menu.

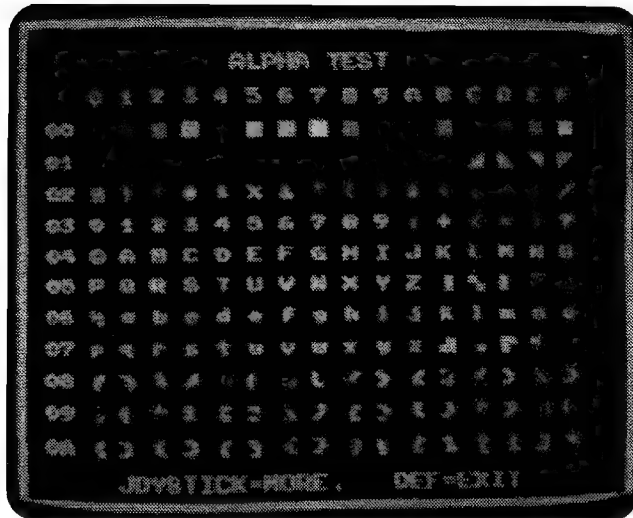


Figure 2-8 Alphanumeric Test Screen

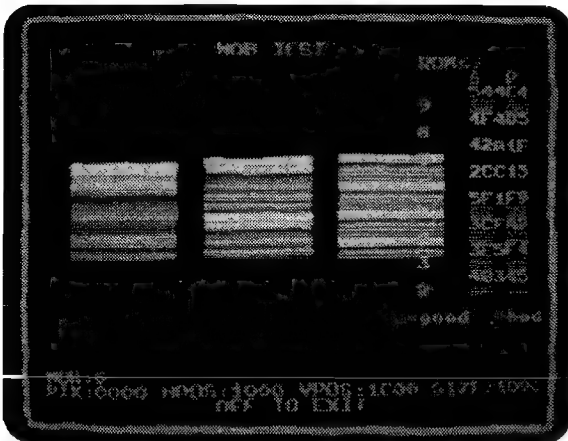


Figure 2-9 Motion Object Test Screen

Motion Object Test

The motion object test screen, shown in Figure 2-9, tests the movement and color of various game objects. The most important part of this screen is the ROM status squares on the right side. The squares should all be green (indicating good motion object ROMs); red squares indicate bad ROMs. The squares are displayed the same way as the ROMs are installed on the game PCB — columns S and P and rows 9 to 2.

Choose an object and move it or change it as follows:

Control:

Left joystick

Right joystick

This action results:

Left/right and up/down moves the object around on the screen.

Up/down enlarges/shrinks the object.

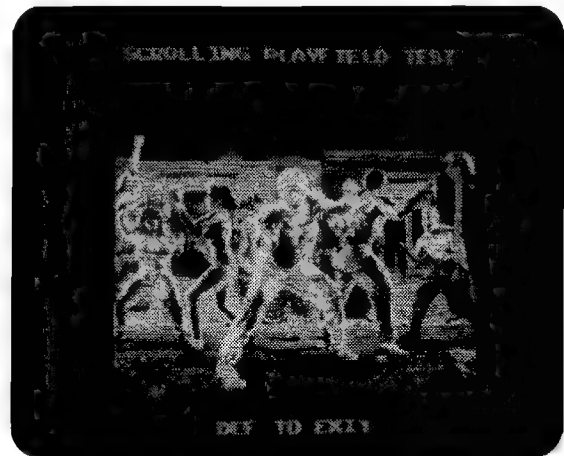


Figure 2-10 Playfield Test Screen

Left Punch, Kick Selects one of the three motion objects (called 0, 1, and 2).

Right Punch, Kick Selects a picture that will be displayed and manipulated as the motion object.

Press any Defend button to go to the select test menu.

Playfield Test

The playfield test screen, shown in Figure 2-10, tests the movement of the playfield.

Move the left joystick up, down, left, and right to check whether the whole picture moves accordingly. Press any Defend button to go to the select test menu.

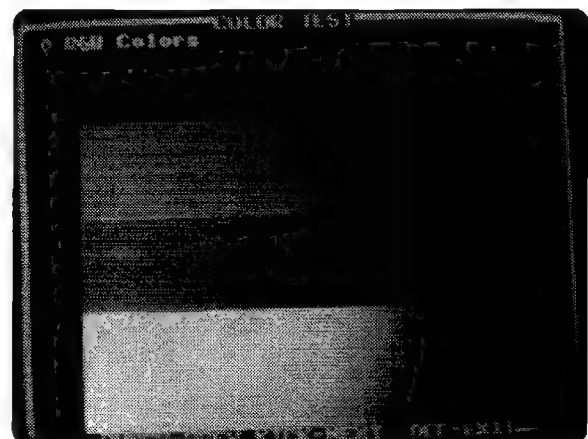


Figure 2-11 Color Test Screen

Color Test

This test has seven screens, the first of which is shown in Figure 2-11. Advance to each screen by pressing the Kick button.

- The first color test (labeled "0-RGB") indicates the dynamic range of the video display color circuit. The screen should show four bands (red, green, blue, and white, from top to bottom), ranging from bright to dark, left to right. The red, green, and blue bands are produced by only one color gun being turned on in each band. At the bottom is a white band, in which all three color guns are turned on.
- The second color test (labeled "1-YCP") shows the same as the first color test, but with two color guns being turned on in three bands — a yellow band (red and green guns), cyan band (blue and green guns), and purple band (blue and red guns). At the bottom is a white band.
- The remaining screen numbers 2 through 6 are color purity tests. The rectangles of color shown are red, green, blue, white ("GREY Purity 1"), and grey ("GREY Purity 2").

Each screen should display a straight rectangle of color, with no curving at the corners, no unevenness of color, and no lines in the display.

If any of these screens are not correct, adjust the video display as described in the video display manual. Return to the select test menu by pressing any Jab button.

Convergence Test

The convergence test has four screens — white, violet, blue, and yellow grid lines. The white screen is shown

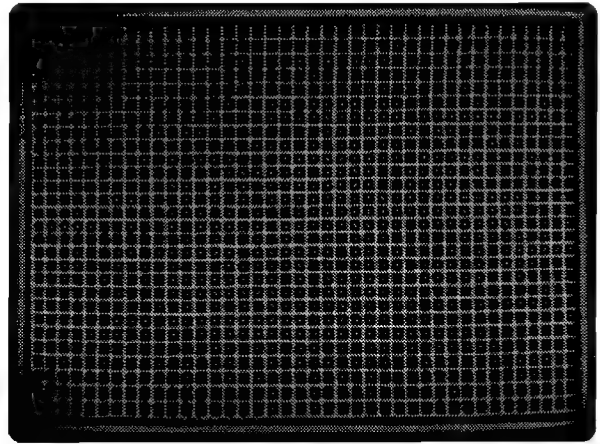


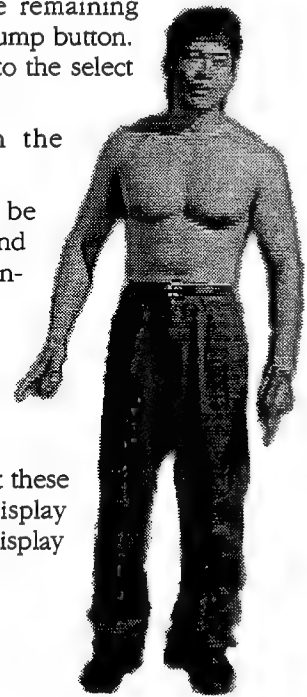
Figure 2-12 Convergence Test Screen

in Figure 2-12. To see the remaining screens, press any Kick or Jump button. Press any Jab button to go to the select test menu.

Check the following on the screens:

- The grid lines should be straight within 3.0 mm and the lines should not pin-cushion or barrel.
- The convergence of the lines on the violet and black screens should be within 2.0 mm.

If these screens do not meet these criteria, adjust the video display as described in the video display manual.

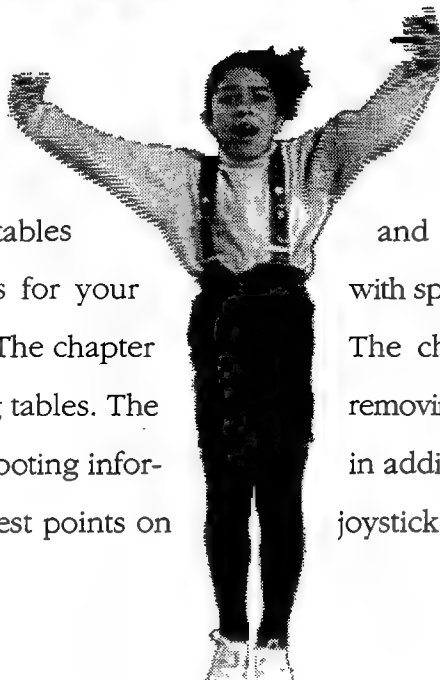


Troubleshooting and Maintenance

Introduction

THIS CHAPTER contains troubleshooting tables and repair procedures for your Guardians of the 'Hood™ game. The chapter includes several troubleshooting tables. The tables contain general troubleshooting information, the voltage levels and test points on

the game printed-circuit board, and a list of ROM-caused problems with specific ROMs to check and replace. The chapter also has instructions for removing and replacing the video display, in addition to repair information for the joystick control.



Problem	Suggested Action
Coin Mechanism Problem	<ol style="list-style-type: none"> 1. Check the wiring to the coin mechanism. 2. Check the voltage to the + side of the mechanism. 3. Test the coin mechanisms with the sound test screen in the self-test.
Game Play Problem	<ol style="list-style-type: none"> 1. Check the harness and connectors. 2. Perform the self-test. 3. Check the voltage levels on the PCB. See Table 3-2, <i>Voltage Inputs and Test Points</i>. 4. Check <i>What ROM Problems Look Like</i>, Table 3-3, for specific ROM problems.
Control Problem	<ol style="list-style-type: none"> 1. Check the harnesses and connectors. 2. Check the switches on the control. 3. If you took the control apart, have you reassembled it correctly? 4. Make sure all the parts on the control are in good repair. Repair or replace parts. 5. Is the "Cabinet Configuration" option in the self-test game options set correctly? <p>NOTE: The joysticks and pushbutton switches do <i>not</i> require lubrication.</p>
Sound Problem	<ol style="list-style-type: none"> 1. Is the speaker volume turned up? (Volume is adjusted digitally in the self-test.) 2. Check the voltage on the PCB edge connector. 3. Check the wiring from the PCB to the speaker. 4. Check the voltage level to the PCB. See Table 3-2, <i>Voltage Inputs and Test Points</i>. 5. Replace the speaker.
Video Display Problem Screen is dark.	<ol style="list-style-type: none"> 1. Is the game plugged in? 2. Is the game turned on? 3. Are the connections good? 4. Is the line fuse good? 5. Is the display brightness turned up? 6. Are the solder connections on the line filter and transformer good? 7. Is the edge connector on the PCB tightly connected? 8. Check all of the items below. If you answer <i>no</i> to any question, you have a problem with the video display, not with the game circuitry. See your video display service manual. <ol style="list-style-type: none"> a. Do you have power to the video display? b. Are the video display's filaments lit? c. Do you have high voltage to the video display? 9. Are the voltage levels to the video display PCB correct? (Power voltage is 110 VAC. Video signal voltage is 0.5 to 3.5 Volts.) 10. If the level is not correct, check the connectors and the harness.
Only a colored screen appears.	You probably have a serious RAM problem.
Display area wavers or is too small.	<ol style="list-style-type: none"> 1. Do you have correct power voltage to the video display PCB? 2. Do you have correct high voltage to the video display?
Picture is wavy.	<ol style="list-style-type: none"> 1. Is the monitor ground connected to the monitor? 2. Are the sync inputs connected properly?
Picture is upside down.	When you serviced the display, you connected the wires incorrectly. Switch the horizontal or vertical yoke wires on the display.
Convergence, purity or color problems.	Use the screens in the self-test (see Chapter 2) to adjust the video display. Use the adjustment procedures in your video display manual.
Picture is not centered.	Use the centering procedures in your video display manual.

Table 3-1 Troubleshooting Table

Voltage	Test Point or LED	Source and Purpose
+5 ± 0.25 VDC	+5V1	Logic power from the switching power supply.
	CR3 LED (Game PCB)	Lights when 5 V is applied to the PCB and the reset (RST) jumper is open.
	CR9 LED (JSA Audio III PCB)	Lights when the +12 V supply is good.
	CR3 LED (JSA Audio III PCB)	Lights when the -5 V supply is good.
+12V	+V0P (pin 4 of LM324)	+12 V from the switching power supply. Positive supply for the analog circuitry.
-5V	-V0P (pin 11 of LM324)	-5V from the switching power supply (if connected). Negative supply for the analog circuitry.

Table 3-2 Voltage Inputs and Test Points on the PCBs

Maintaining the Coin Mechanism

The coin mechanism should be cleaned every three months. For detailed parts information on the coin door, see Figure 4-3. To maintain the coin mechanism:

1. Turn power off to the game. Open the upper coin door.
2. Open the gate on the door covering the magnet. Use the blade of a screwdriver to scrape away any metal filings collected on the magnet.
3. For a thorough cleaning, wash the coin mechanism in hot soapy water. Use a toothbrush to remove any stubborn build-up of residue in the coin path.
4. Dry the coin mechanism with compressed air.
5. If you do not want to use water, brush the loose dust off with a soft brush and scrub the residue in the coin path with a toothbrush. Blow out all the loose dust and dirt with compressed air.

NOTE

Never lubricate the coin mechanism with oil or grease.



Repairing the Video Display

The video display frame in this cabinet is designed to be used with both horizontal- and vertical-mounting displays, as well as 19- and 25-inch displays.

Removing the Video Display

If you have a problem with the video display, first run the self-test procedure to narrow down the cause. To make adjustments to the video display, unlock the service door on the rear of the cabinet.

If you want to repair the video display, remove it from the game by following this procedure:

1. Turn the game power off and wait two minutes. Unplug the power cord for safety.
2. While you wait, unlock the upper rear service door on the cabinet.
3. Remove the three screws that attach the attraction shield retainer, and remove the retainer, shield, and attraction film. Then remove the display shield, cardboard bezels, and cleats in front of the display.



Problem	ROM Causing the Problem	Check the ROM at:
Program works, but the motion objects are missing or bad	Graphics	Playfield: 20D-21D. Motion Object High: 2S-7S. Motion Object Low: 2P-7P. Alphanumerics: 22J.
Garbage on screen; program doesn't work	Processor Program ROM 0	14C 8D, 8C
Game program is erratic.	Program ROM 1	9D, 9C
No sound or erratic sound	Audio ROM: Audio Program Audio ADPCM	12C 19E

Table 3-3 What ROM Problems Look Like**WARNING****High Voltage**

The video display contains lethal high voltages. To avoid injury, do not service this display until you observe all precautions necessary for working on high-voltage equipment.

X-Radiation

This video display is designed to minimize X-radiation. However, to avoid possible exposure to soft X-radiation, never modify the high-voltage circuitry.

Implosion Hazard

The cathode-ray tube (CRT) may implode if struck or dropped. The shattered glass from the tube may cause injury up to six feet away. Use care when handling the display and when removing it from the game cabinet. Also, wear gloves to protect your hands from the sheet-metal edges.

4. Remove the four nuts and washers that secure the video display.
5. Discharge the high voltage from the cathode-ray tube (CRT). The display assembly contains a circuit for discharging the high voltage to ground when power is removed. However, to make certain, always discharge the display as follows:
 - a. Attach one end of a solid 18-gauge wire to a well-insulated screwdriver or wooden handle.
 - b. Attach the other end of the wire to an earth ground.
 - c. Quickly touch the blade end of the screwdriver to the CRT anode by sliding it under the anode cap.
 - d. Wait two minutes and repeat part c.
6. Disconnect the harness connectors from the video display.
7. Pull the video display assembly out of the cabinet. Be extremely careful.

Replacing the Video Display

Perform the following procedure to replace the video display in the cabinet.

1. Carefully lift the video display into the cabinet.
2. Install the nuts that hold the video display assembly.
3. Connect the power and signal harnesses to the video display.
If you replace the CRT and yoke together, adjust the brightness, size, and centering as described in the video display service manual. Check the purity and convergence according to that manual, but adjust both only if required.
4. Install the cardboard bezel, video display shield, and cleats. Replace the attraction film, attraction shield, and retainer.
5. Lock the rear service door on the cabinet.

Screen Color	RAM Error Location
Red	Working RAM
Green	Playfield RAM
Blue	Motion Object RAM

Table 3-4 Screen Colors Indicating Bad RAMs

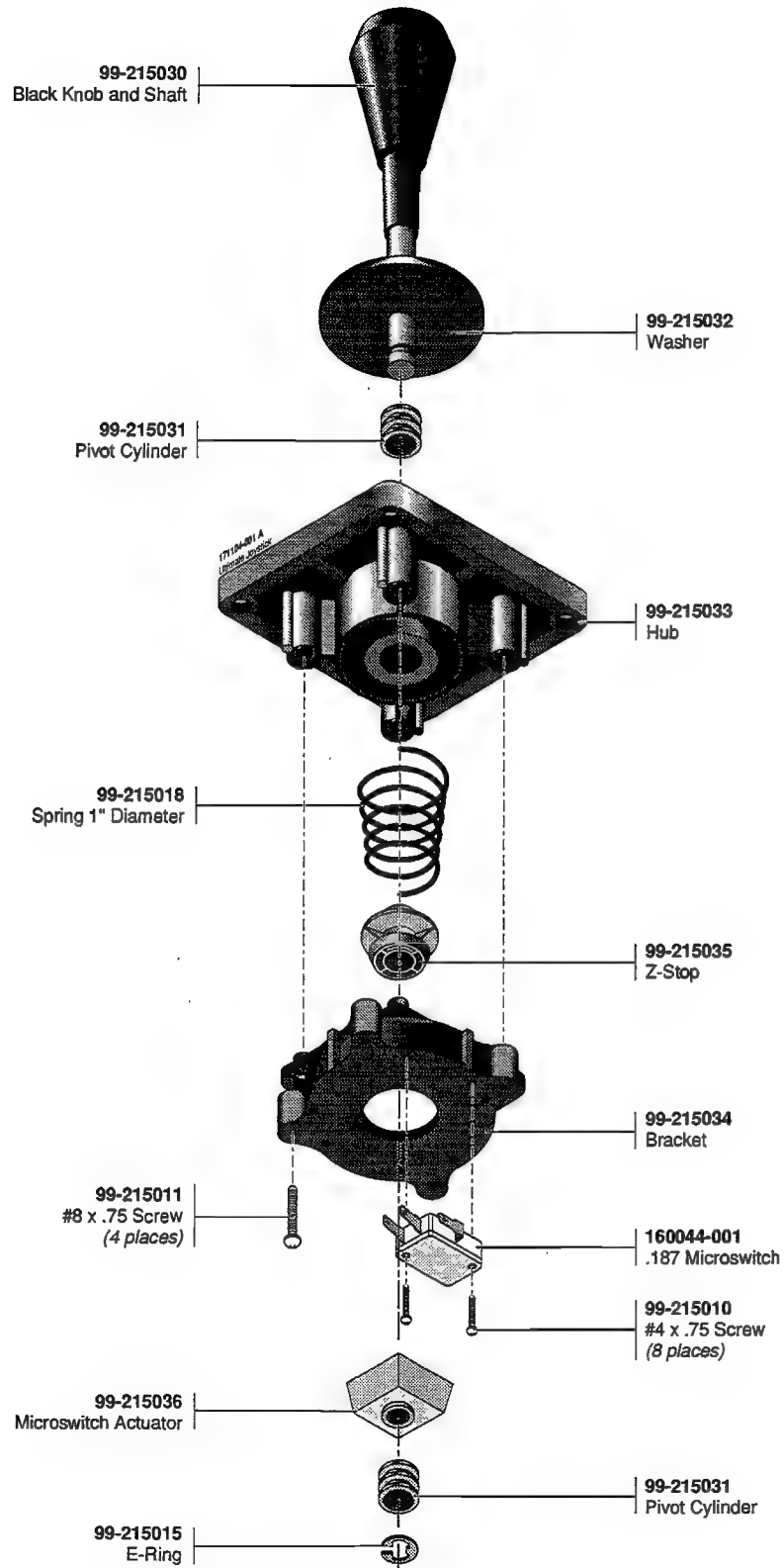


Figure 3-1 Maintaining the Joystick Control

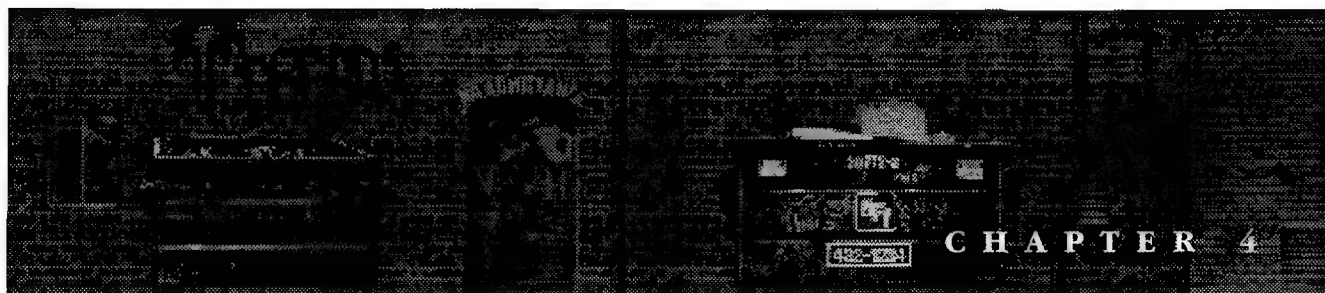
Removing and Replacing the Joystick Control

The joystick control is shown in Figure 3-1. If you want to repair this control, remove it from the control panel. To repair the joystick, disassemble it by removing the retaining ring at the bottom of the shaft. To replace any of the four switches, remove the two screws that secure each switch.

ROMs and RAMs

If you think you have bad ROMs or RAMs, run the self-test. If you see only a colored screen and cannot enter the self-test, see Table 3-3. Also refer to Table 3-4 if you think you have a RAM problem.





Parts Illustrations

Part Ordering Information

THIS CHAPTER provides information you need to order parts for your game. The PCB parts lists are arranged in alphabetical order by component. Within each section the parts are arranged numerically by part number. ¶ When you order parts, give the part number, part name, the number of this manual,



and the serial number of your game. With this information, we can fill your order rapidly and correctly. We hope this will create less downtime and more profit from your games. Atari Games Customer Service phone numbers are listed on the inside front cover of this manual.

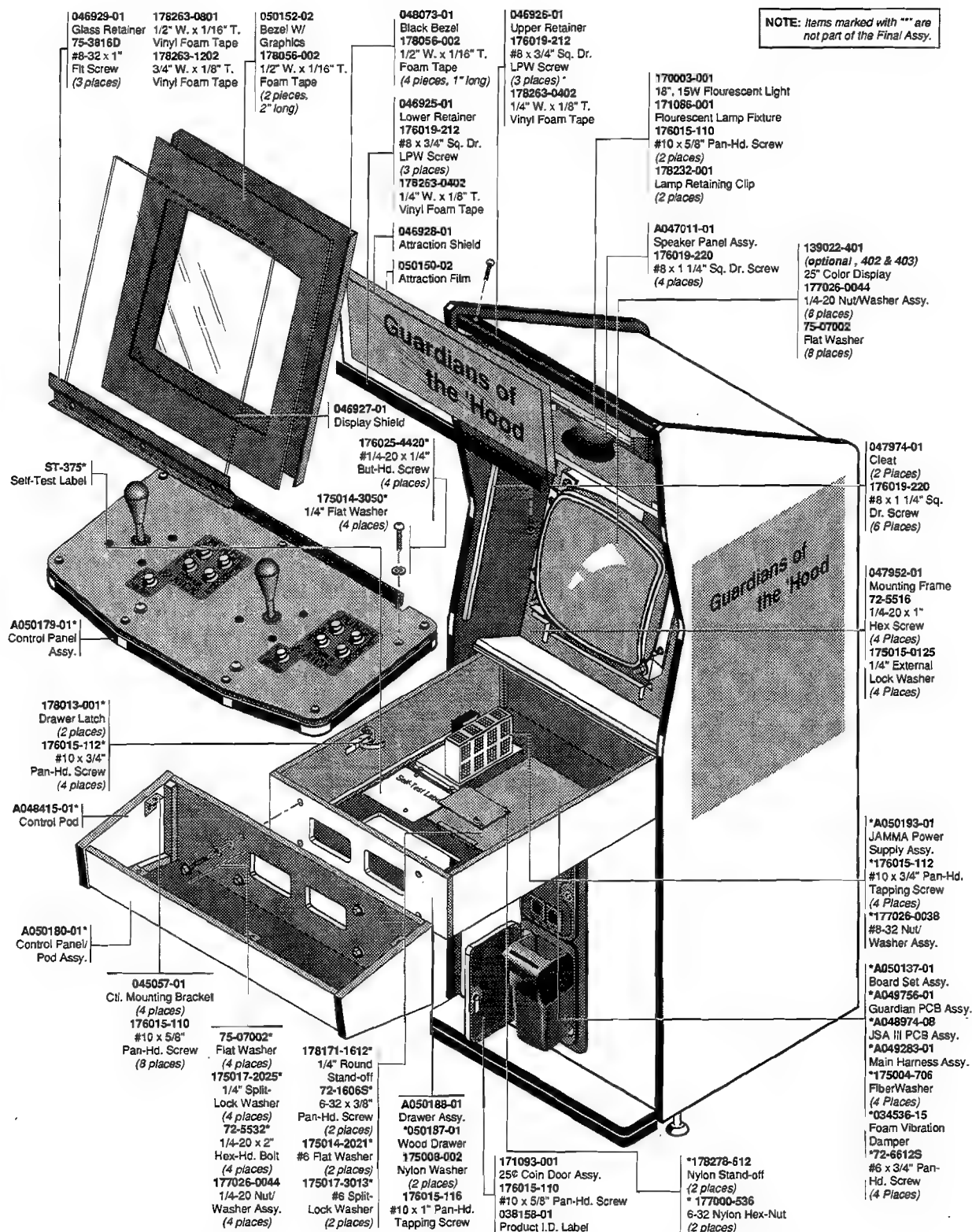


Figure 4-1 Cabinet-Mounted Assemblies, Front View

A050190-01 D

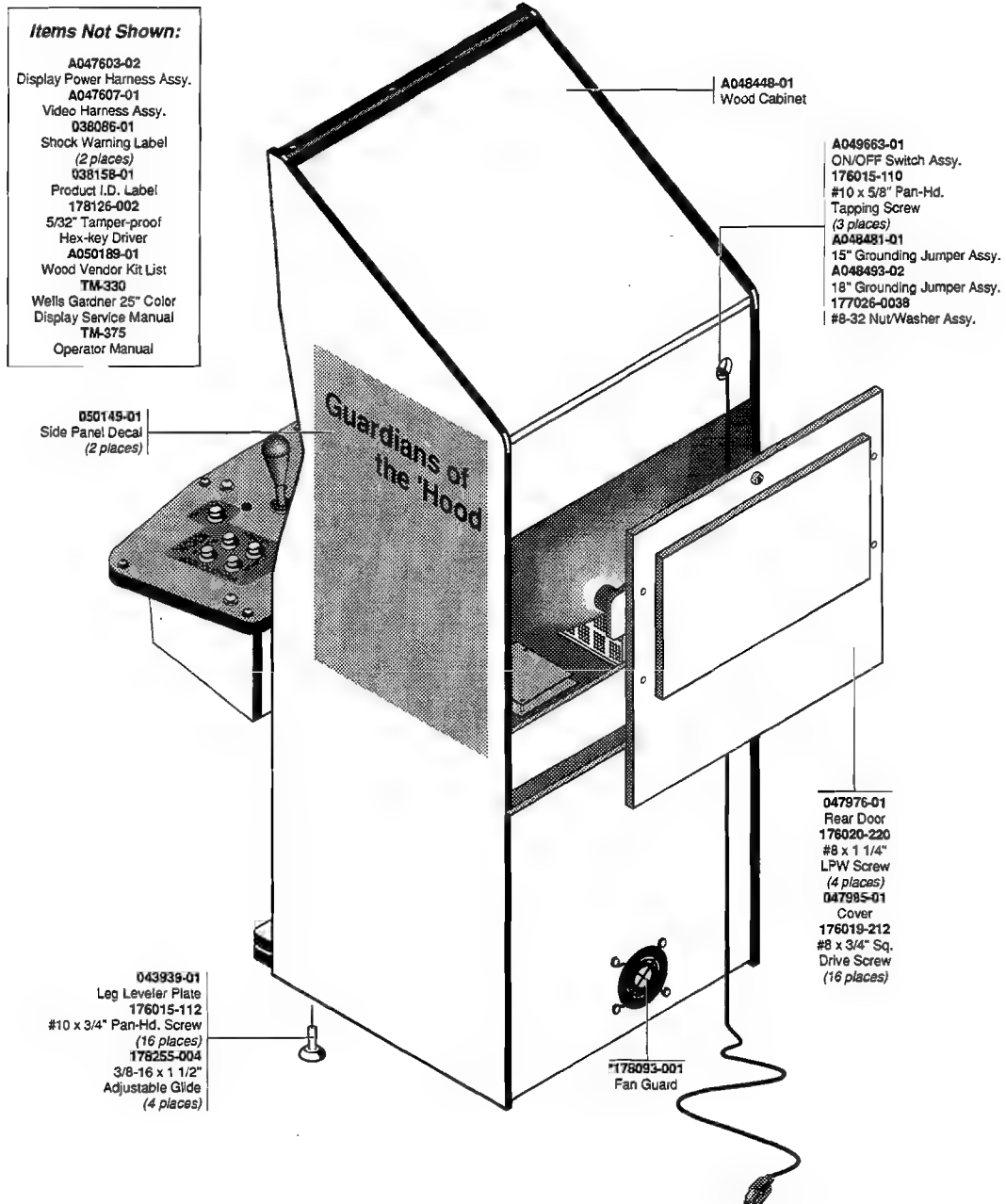


Figure 4-1 Cabinet-Mounted Assemblies, Front View

A050190-01 D

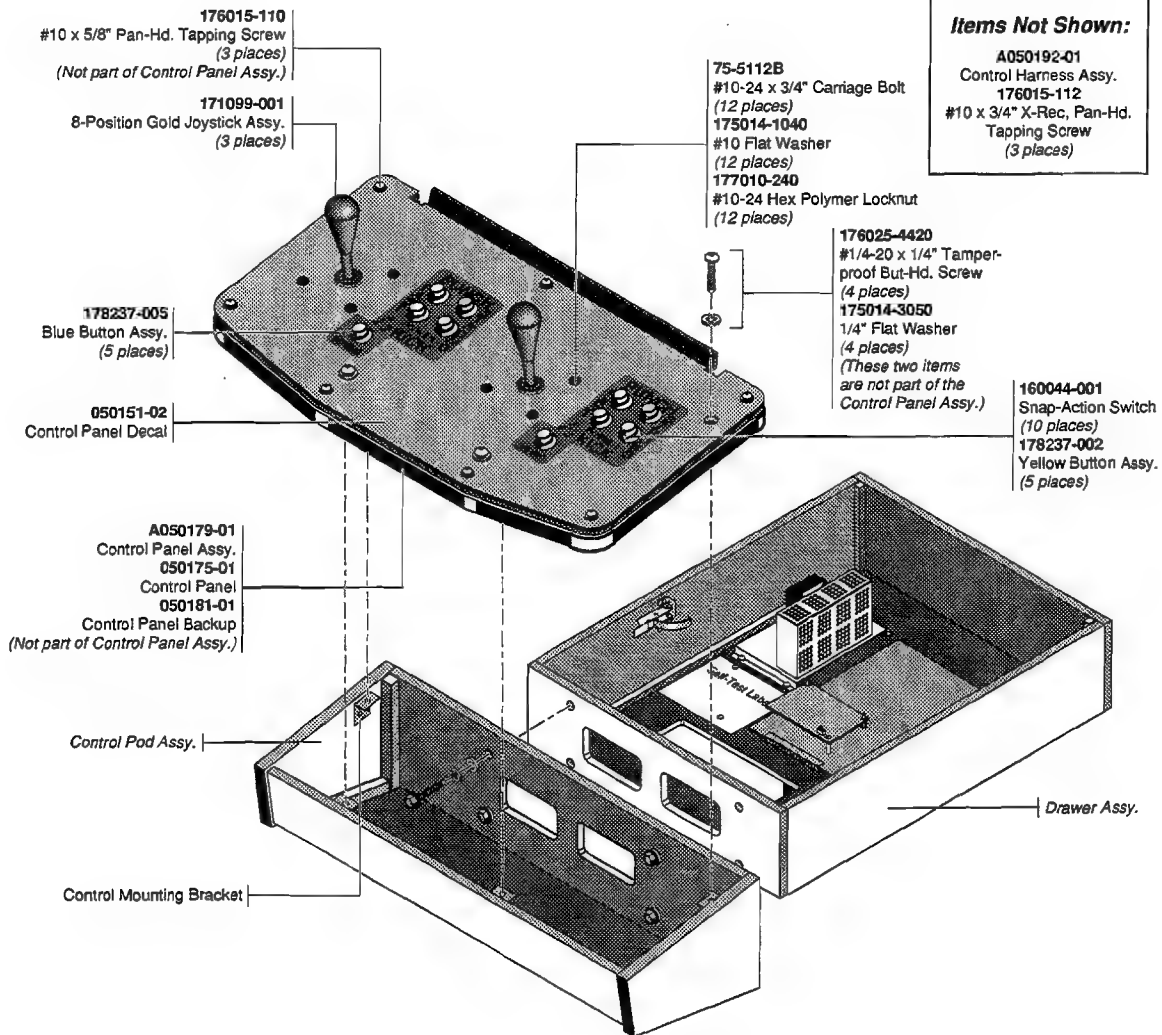


Figure 4-2 Control Panel Assembly

A050179-01 B

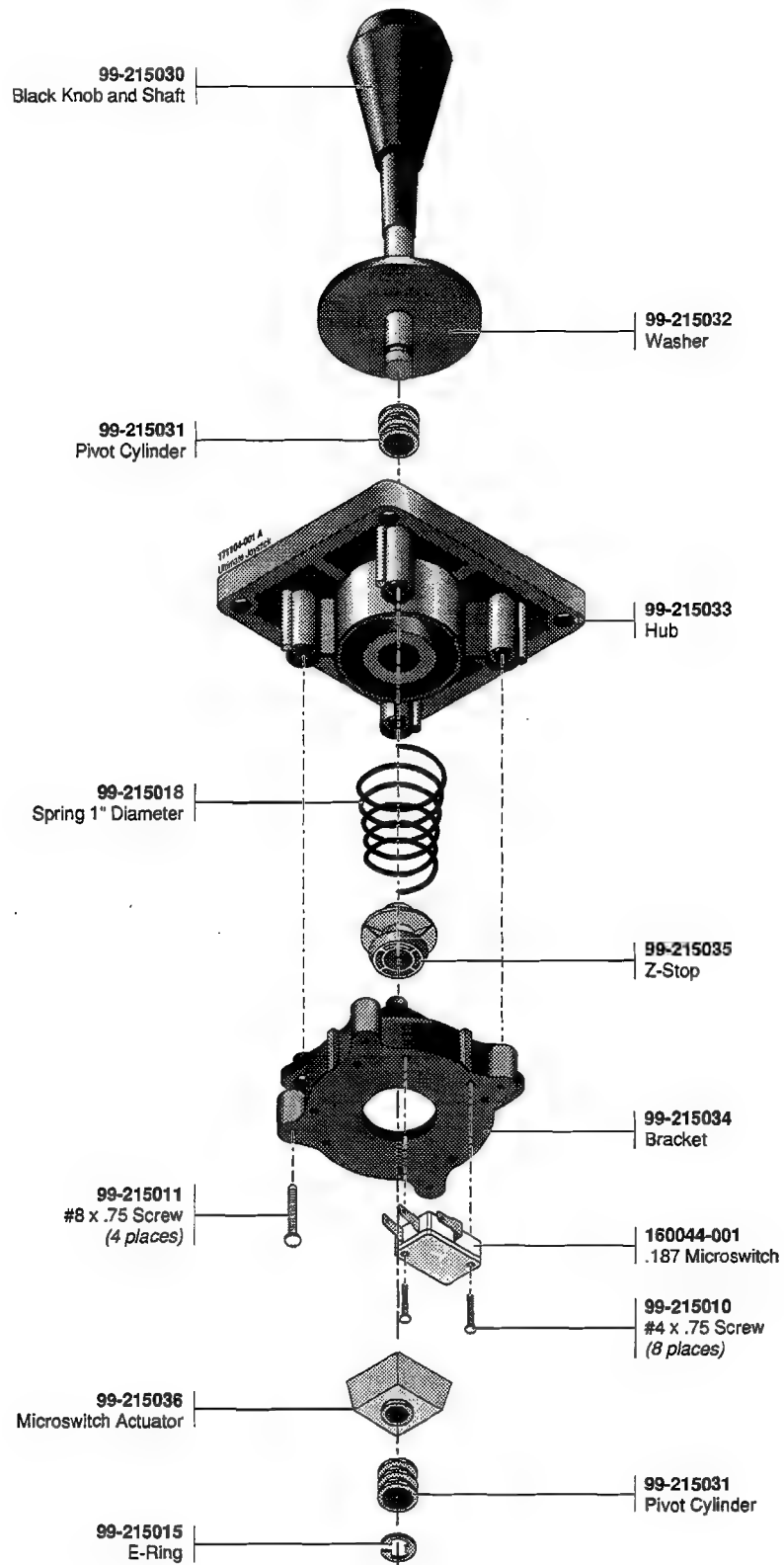


Figure 4-3 Joystick Assembly

171099-001

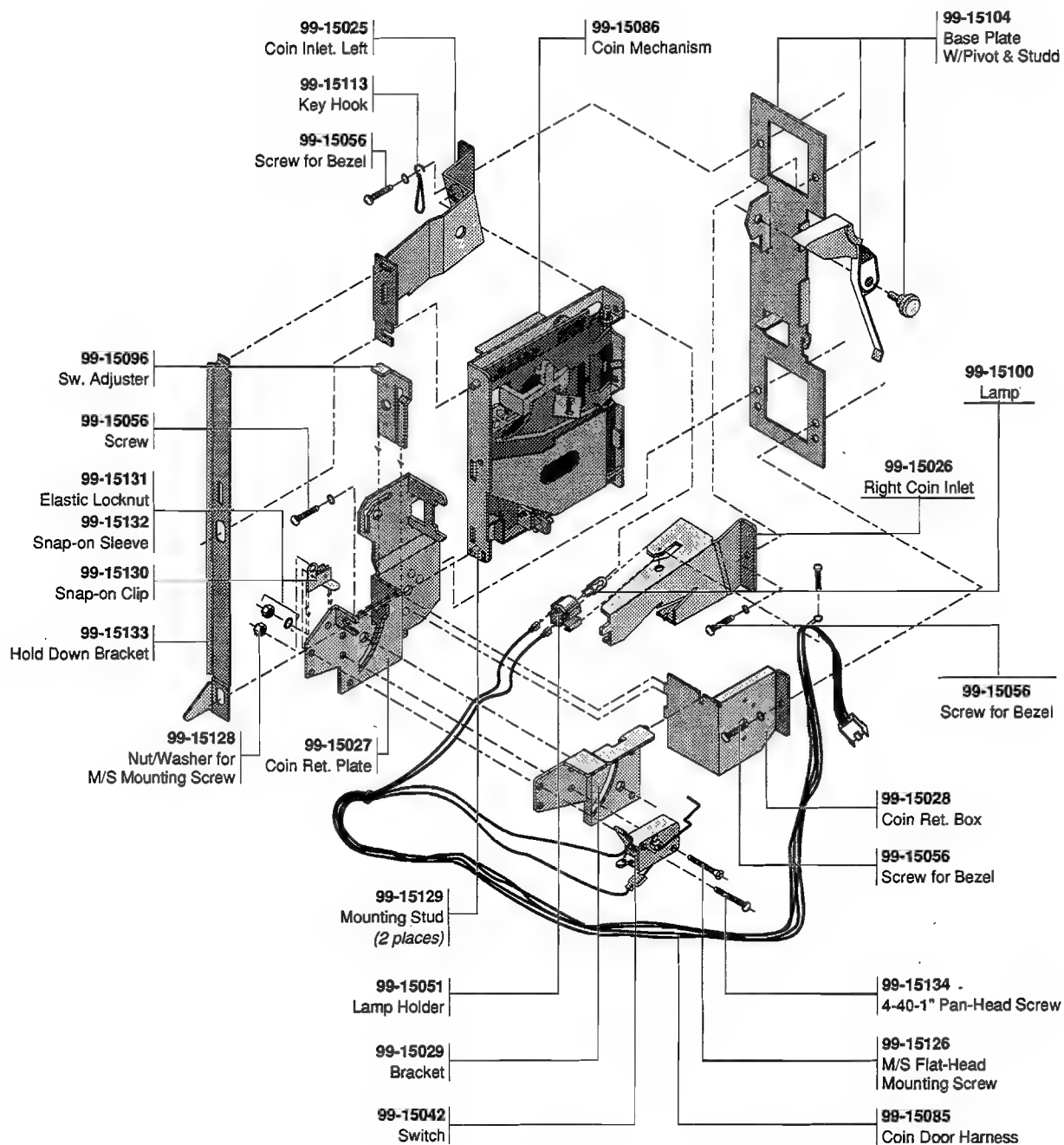


Figure 4-4 Coin Controls, Inc. Coin Door Assembly

171093-001

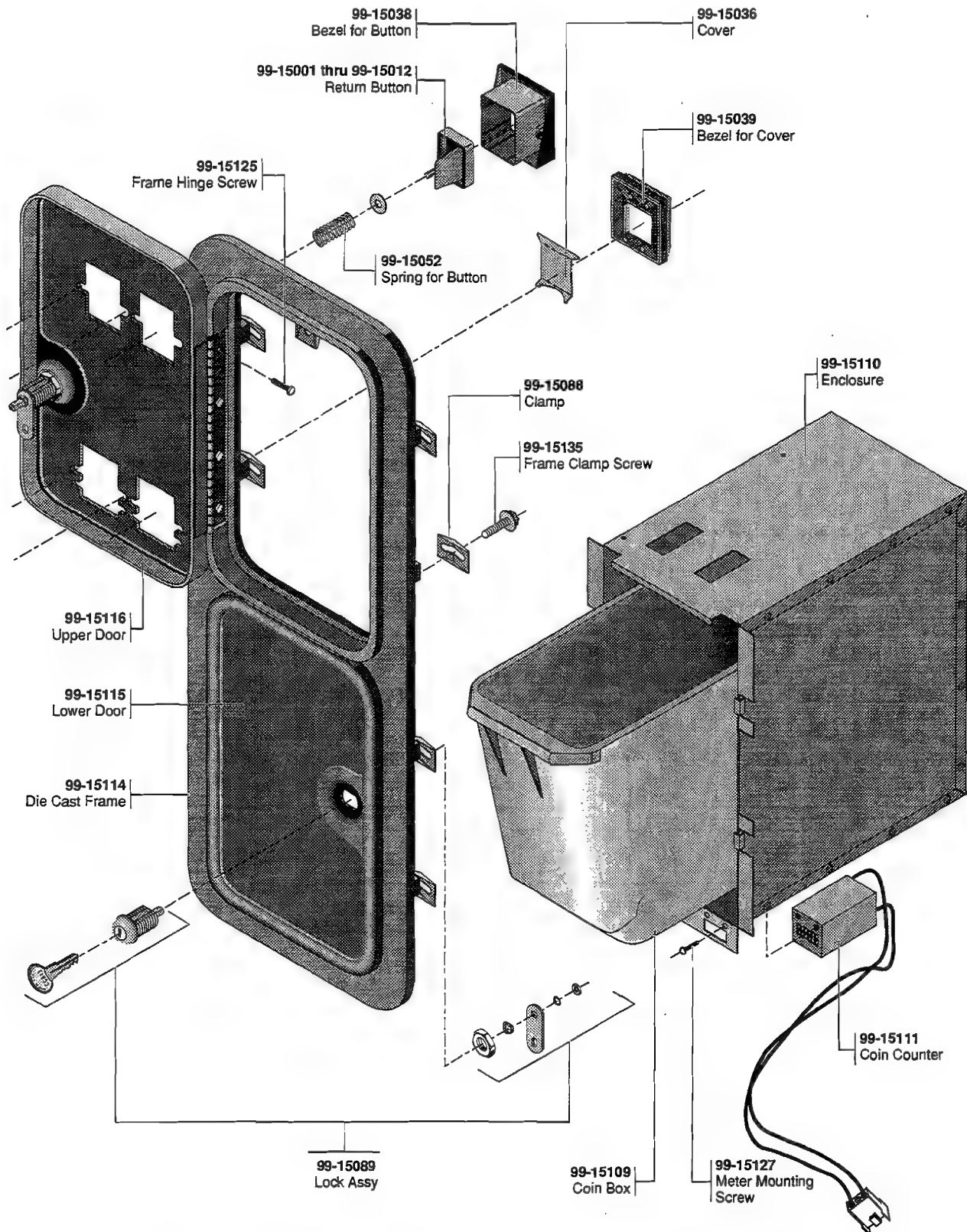
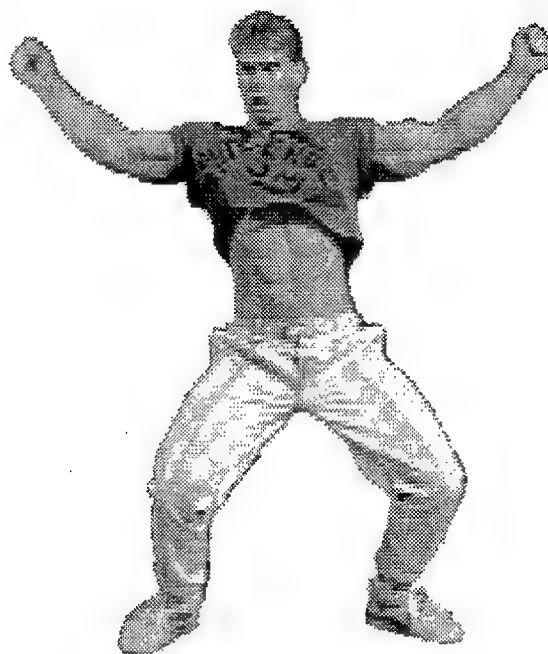


Figure 4-4 Coin Controls, Inc. Coin Door Assembly, Continued

171093-001

NOTES



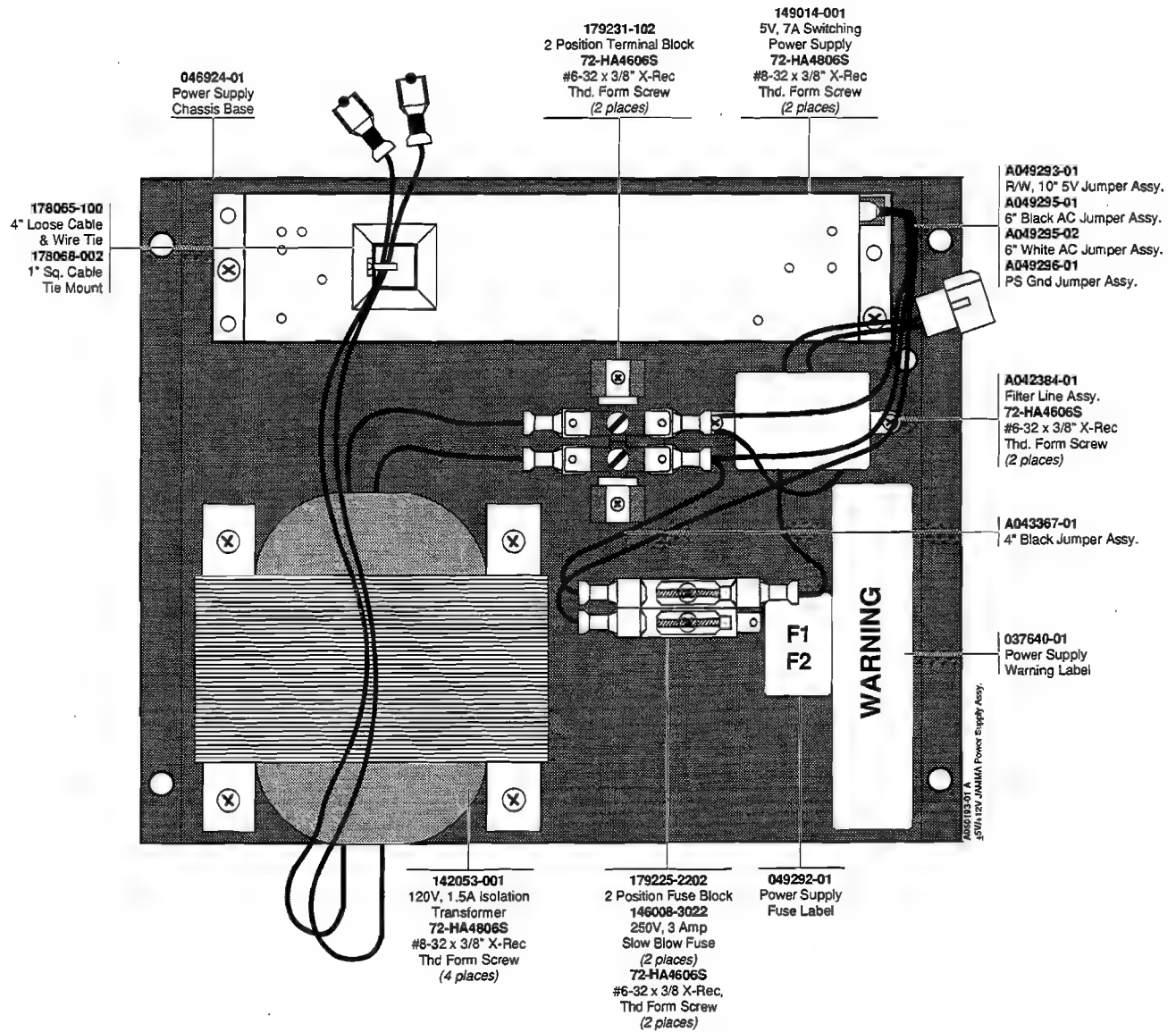


Figure 4-5 Power Supply Assembly

A050193-01 A

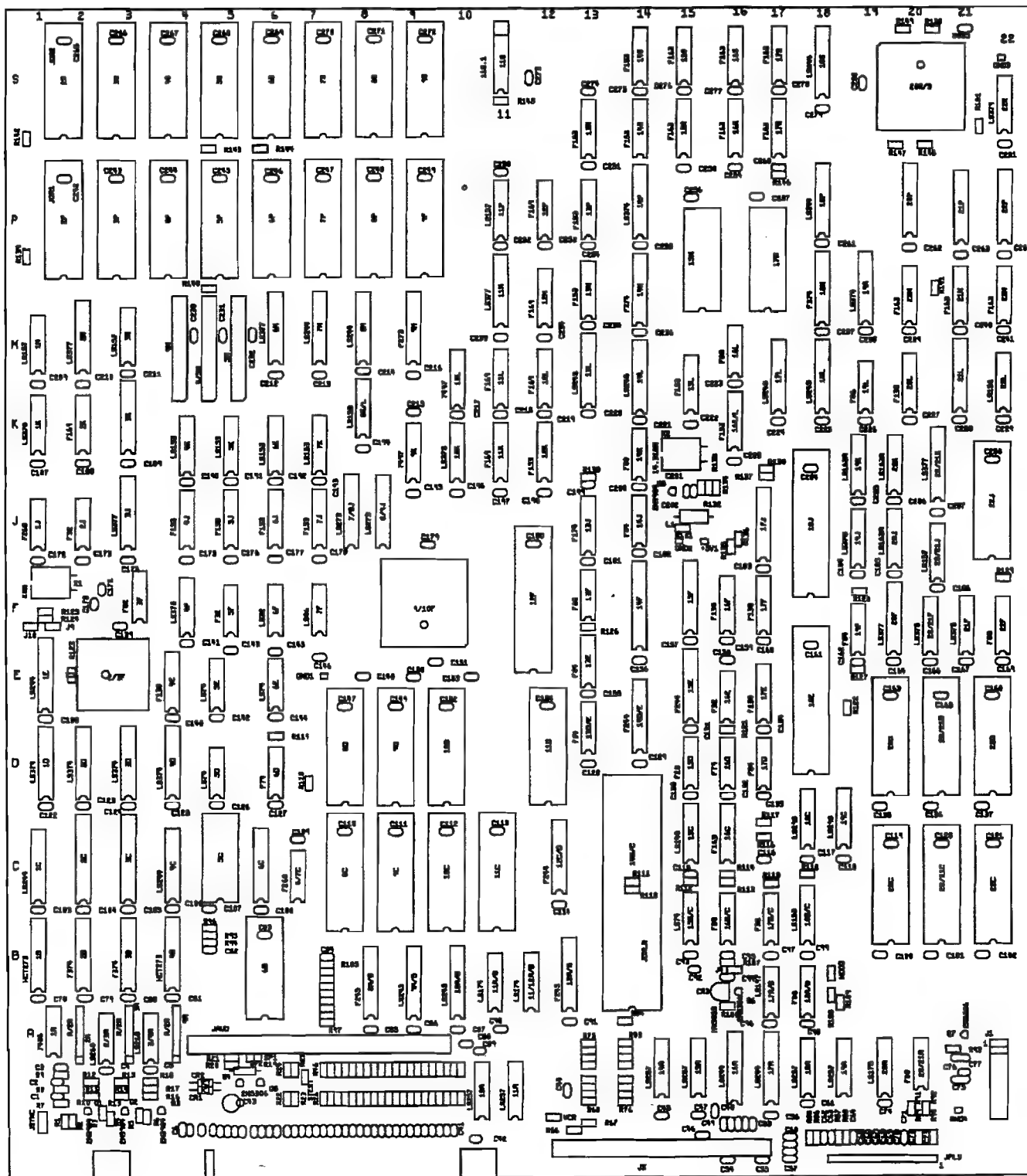


Figure 4-6 Guardians of the 'Hood Game PCB Assembly

A049757-07 A

Guardians of the 'Hood Game PCB Assembly Parts List

Designator	Description	Part No.	Designator	Description	Part No.
Sockets					
2/3F	Socket, 44 Pin, Plcc	179237-044	2/3A	Integrated Circuit, 74LS260	137332-001
2C	Socket, 24 Pin, .300	179259-024	2/3F	ASIC 65	136092-0012
2P, 2S	Socket, 32 Pin, .600	179257-032	2A	Res, R/2R, 1K/2K	118016-001
3C	Socket, 24 Pin, .300	179259-024	2B	Integrated Circuit, 74F374	137420-001
3K	Socket, 20 Pin, .300	179259-020	2C	Integrated Circuit, RAM, 2K x 8, 35 ns, .3	137534-001
3P, 3S	Socket, 32 Pin, .600	179257-032	2D	Integrated Circuit, 74LS374	137144-001
4/5M, 4M	Socket, Zip 28	179302-028	2J	Integrated Circuit, 74F32	137486-001
4P, 4S	Socket, 32 Pin, .600	179257-032	2K	Integrated Circuit, 74F169	137496-001
5C	Socket, 24 Pin, .600	179257-024	2M	Integrated Circuit, 74LS377	137145-001
5M	Socket, Zip 28	179302-028	2P	EPROM, 150 ns, 512K x 8	136092-0040
5P, 5S	Socket, 32 Pin, .600	179257-032	2S	EPROM, 150 ns, 512K x 8	136092-0041
6C	Socket, 20 Pin, .300	179259-020	3/4A	Integrated Circuit, 74LS260	137332-001
6P, 6S, 7P, 7S, 8C, 8D, 8P, 8S	Socket, 32 Pin, .600	179257-032	3A	Res, R/2R, 1K/2K	118016-001
9/10F	Socket, 68 Pin, PLCC	179237-068	3B	Integrated Circuit, 74F374	137420-001
9C, 9D, 9P, 9S, 10C, 10D, 11C, 11D	Socket, 32 Pin, .600	179257-032	3C	Integrated Circuit, RAM, 2K x 8, 35 ns, .3	137534-001
11S	Socket, 20 Pin, .300	179259-020	3D	Integrated Circuit, 74LS374	137144-001
12F	Socket, 40 Pin, .600	179257-040	3F	Integrated Circuit, 74F02	137481-001
14B/C	Socket, 64 Pin, .900	179256-064	3J	Integrated Circuit, 74LS377	137145-001
14F	Socket, 24 Pin, .300	179259-024	3K	GAL16V8, 25 ns	136092-0005
15F	Socket, 20 Pin, .300	179259-020	3M	Integrated Circuit, 74LS157	137029-001
15N	Socket, 28 Pin, .600	179257-028	3P	EPROM, 150 ns, 512K x 8	136092-0042
17J	Socket, 20 Pin, .300	179259-020	3S	EPROM, 150 ns, 512K x 8	136092-0043
17N	Socket, 28 Pin, .600	179257-028	4/5M	Integrated Circuit, VRAM, 256K x 4, 100 ns	137682-100
18E, 18J	Socket, 40 Pin, .600	179257-040	4A	Res, R/2R, 1K/2K	118016-001
20/21C, 20/21D, 20C, 20D	Socket, 32 Pin, .600	179257-032	4B	Integrated Circuit, 74HCT273	137655-001
20P	Socket, 20 Pin, .300	179259-020	4C	Integrated Circuit, 74LS244	137038-001
20R/S	Socket, 68 Pin, PLCC	179237-068	4D	Integrated Circuit, 74LS374	137144-001
21L, 21P	Socket, 20 Pin, .300	179259-020	4E	Integrated Circuit, 74F138	137521-001
22C, 22D, 22J	Socket, 32 Pin, .600	179257-032	4F	Integrated Circuit, 74LS378	137305-001
22P	Socket, 20 Pin, .300	179259-020	4J	Integrated Circuit, 74F153	137492-001
Integrated Circuits			4K	Integrated Circuit, 74LS153	137104-001
1A	Integrated Circuit, 7406	137052-001	4M	Integrated Circuit, VRAM, 256K x 4, 100 ns	137682-100
1B	Integrated Circuit, 74HCT273	137655-001	4P	EPROM, 150 ns, 512K x 8	136092-0044
1C	Integrated Circuit, 74LS244	137038-001	4S	EPROM, 150 ns, 512K x 8	136092-0045
1D	Integrated Circuit, 74LS374	137144-001	5C	Integrated Circuit, 28C16-200, 200 ns	137648-200
1E	Integrated Circuit, 74LS244	137038-001	5D, 5E	Integrated Circuit, 74LS74	137023-001
1J	Integrated Circuit, 74F260	137570-001	5F	Integrated Circuit, 74F32	137486-001
1K	Integrated Circuit, 74LS378	137305-001	5J	Integrated Circuit, 74F153	137492-001
1M	Integrated Circuit, 74LS157	137029-001	5K	Integrated Circuit, 74LS153	137104-001
			5M	Integrated Circuit, VRAM, 256K x 4, 100 ns	137682-100

Guardians of the 'Hood Game PCB Assembly Parts List, Continued

Designator	Description	Part No.	Designator	Description	Part No.
5P	EPROM, 150 ns, 512K x 8	136092-0046	12F	Integrated Circuit, SOS	137550-001
5S	EPROM, 150 ns, 512K x 8	136092-0047	12K	Integrated Circuit, 74F153	137492-001
6/7C	Integrated Circuit, 74F260	137570-001	12L,12N,12P	Integrated Circuit, 74F169	137496-001
6C	GAL16V8, 25 ns	136092-0009	13D/E,13E	Integrated Circuit, 74F04	137437-001
6D	Integrated Circuit, 74F74	137436-001	13F	Integrated Circuit, 74F02	137481-001
6E	Integrated Circuit, 74LS74	137023-001	13J	Integrated Circuit, 74F174	137531-001
6F	Integrated Circuit, 74LS32	137019-001	13L	Integrated Circuit, 74LS245	137134-001
6J	Integrated Circuit, 74F153	137492-001	13N,13P,13R	Integrated Circuit, 74F153	137492-001
6K	Integrated Circuit, 74LS153	137104-001	14A	Integrated Circuit, 74LS257	137136-001
6M	Integrated Circuit, 74LS377	137145-001	14B/C	Integrated Circuit, 68000, 16 MHz	137669-0001
6P	EPROM, 150 ns, 512K x 8	136092-0048	14D/E	Integrated Circuit, 74F244	137502-001
6S	EPROM, 150 ns, 512K x 8	136092-0049	14F	GAL6001, 35 ns	136092-0010
7/8J	Integrated Circuit, 74LS273	137040-001	14J	Integrated Circuit, 74F04	137437-001
7F	Integrated Circuit, 74LS86	137079-001	14K	Integrated Circuit, 74F00	137327-001
7J	Integrated Circuit, 74F153	137492-001	14L	Integrated Circuit, 74LS245	137134-001
7K	Integrated Circuit, 74LS153	137104-001	14N	Integrated Circuit, 74F374	137420-001
7M	Integrated Circuit, 74LS244	137038-001	14P	Integrated Circuit, 74LS374	137144-001
7P	EPROM, 150 ns, 512K x 8	136092-0050	14R, 14S	Integrated Circuit, 74F153	137492-001
7S	EPROM, 150 ns, 512K x 8	136092-0051	15A	Integrated Circuit, 74LS257	137136-001
8/9J	Integrated Circuit, 74LS273	137040-001	15B/C	Integrated Circuit, 74LS74	137023-001
8A/B	Integrated Circuit, 74F245	137591-001	15C	Integrated Circuit, 74LS148	137417-001
8C	EPROM, 150 ns, 128K x 8	136092-0020	15D	Integrated Circuit, 74F20	137530-001
8D	EPROM, 150 ns, 128K x 8	136092-0021	15E	Integrated Circuit, 74F244	137502-001
8K/L	Integrated Circuit, 74LS153	137104-001	15F	GAL16V8, 25 ns	136092-0007
8M	Integrated Circuit, 74LS244	137038-001	15L	Integrated Circuit, 74F153	137492-001
9/10F	FPLA	136092-0004	15N	Integrated Circuit, RAM, 32K x 8, 70 ns, .6	137615-070
9A/B	Integrated Circuit, 74LS245	137134-001	15R, 15S	Integrated Circuit, 74F163	137345-001
9C	EPROM, 200 ns, 128K x 8	136092-0022	16B/C	Integrated Circuit, 74F08	137483-001
9D	EPROM, 200 ns, 128K x 8	136092-0023	16C	Integrated Circuit, 74F163	137345-001
9K	Integrated Circuit, 7497	137090-001	16D	Integrated Circuit, 74F74	137436-001
9M	Integrated Circuit, 74F273	137610-001	16E	Integrated Circuit, 74F32	137486-001
10A	Integrated Circuit, 74LS257	137136-001	16F	Integrated Circuit, 74F138	137521-001
10A/B	Integrated Circuit, 74LS245	137134-001	16K/L	Integrated Circuit, 74F153	137492-001
10K	Integrated Circuit, 74LS378	137305-001	16L	Integrated Circuit, 74F00	137327-001
10L	Integrated Circuit, 7497	137090-001	16R, 16S	Integrated Circuit, 74F163	137345-001
11/12A/B	Integrated Circuit, 74LS174	137122-001	17A	Integrated Circuit, 74LS244	137038-001
11A	Integrated Circuit, 74LS257	137136-001	17A/B	Integrated Circuit, 74LS197	137240-001
11A/B	Integrated Circuit, 74LS174	137122-001	17B/C	Integrated Circuit, 74F32	137486-001
11K, 11L	Integrated Circuit, 74F169	137496-001	17D	Integrated Circuit, 74F04	137437-001
11N	Integrated Circuit, 74LS377	137145-001	17E, 17F	Integrated Circuit, 74F138	137521-001
11P	Integrated Circuit, 74LS157	137029-001	17J	GAL16V8, 25 ns	136092-0008
11S	GAL16V8, 25 ns	136092-0011	17L	Integrated Circuit, 74LS245	137134-001
12A/B	Integrated Circuit, 74F245	137591-001	17N	Integrated Circuit, RAM, 32K x 8, 70 ns, .6	137615-070
12C/D	Integrated Circuit, 74F244	137502-001			

Guardians of the 'Hood Game PCB Assembly Parts List, Continued

Designator	Description	Part No.	Designator	Description	Part No.
17R, 17S	Integrated Circuit, 74F163	137345-001	Capacitors		
18A	Integrated Circuit, 74LS257	137136-001	C1, C2	Capacitor, 100 pF, 100 V, $\pm 5\%$, Ceramic	122016-101
18A/B	Integrated Circuit, 74F08	137483-001	C3-C6	Capacitor, .1 μ F, 50 V, +80%–20%, Ceramic	122002-104
18B/C	Integrated Circuit, 74LS153	137104-001	C7-C10	Capacitor, .01 μ F, 50 V, +80%–20%, Ceramic	122002-103
18E	Integrated Circuit, SOS	137550-001	C11, C12	Capacitor, 1000 pF, 100 V, $\pm 10\%$, Ceramic	122015-102
18J	Integrated Circuit, PFHS	137419-104	C13-C17	Capacitor, 100 pF, 100 V, $\pm 5\%$, Ceramic	122016-101
18L	Integrated Circuit, 74LS245	137134-001	C18-C42	Capacitor, .01 μ F, 50 V, +80%–20%, Ceramic	122002-103
18N	Integrated Circuit, 74F374	137420-001	C43	Capacitor, 100 μ F, 16 V, Electrolytic, Radial	123013-107
18P, 18S	Integrated Circuit, 74LS244	137038-001	C44, C45	Capacitor, .1 μ F, 50 V, +80%–20%, Ceramic	122002-104
19A	Integrated Circuit, 74LS257	137136-001	C46	Capacitor, 100 pF, 100 V, $\pm 5\%$, Ceramic	122016-101
19C	Integrated Circuit, 74LS298	137201-001	C47, C48	Capacitor, .1 μ F, 50 V, +80%–20%, Ceramic	122002-104
19F	Integrated Circuit, 74F04	137437-001	C49-C55	Capacitor, 100 pF, 100 V, $\pm 5\%$, Ceramic	122016-101
19J	Integrated Circuit, 74LS378	137305-001	C56	Capacitor, .1 μ F, 50 V, +80%–20%, Ceramic	122002-104
19K	Integrated Circuit, 74LS163 A	137114-001	C57-C60	Capacitor, 100 pF, 100 V, $\pm 5\%$, Ceramic	122016-101
19L	Integrated Circuit, 74F86	137649-001	C61-C74	Capacitor, .1 μ F, 50 V, +80%–20%, Ceramic	122002-104
19N	Integrated Circuit, 74LS374	137144-001	C75	Capacitor, 1000 pF, 100 V, $\pm 5\%$, Ceramic	122016-102
20/21A	Integrated Circuit, 74F00	137327-001	C76	Capacitor, .01 μ F, 50 V, +80%–20%, Ceramic	122002-103
20/21C	EPROM, 200 ns, 128K x 8	136092-0034	C77	Capacitor, 1000 pF, 100 V, $\pm 5\%$, Ceramic	122016-102
20/21D	EPROM, 200 ns, 128K x 8	136092-0033	C78-C88	Capacitor, .1 μ F, 50 V, +80%–20%, Ceramic	122002-104
20/21F	Integrated Circuit, 74LS378	137305-001	C89	Capacitor, 100 pF, 100 V, $\pm 5\%$, Ceramic	122016-101
20/21J	Integrated Circuit, 74LS157	137029-001	C90, C91, C93-C169	Capacitor, .1 μ F, 50 V, +80%–20%, Cer.	122002-104
20/21K	Integrated Circuit, 74LS377	137145-001	C170, C171	Capacitor, 10 pF, 100 V, $\pm 5\%$, Cer.	122016-100
20A	Integrated Circuit, 74LS175	137123-001	C172-C200	Capacitor, .1 μ F, 50 V, +80%–20%, Ceramic	122002-104
20C	EPROM, 200 ns, 128K x 8	136092-0036	C201, C202	Capacitor, 100 pF, 100 V, $\pm 5\%$, Cer.	122016-101
20D	EPROM, 200 ns, 128K x 8	136092-0035	C203-C282	Capacitor, .1 μ F, 50 V, +80%–20%, Cer.	122002-104
20F	Integrated Circuit, 74LS377	137145-001			
20J, 20K	Integrated Circuit, 74LS163 A	137114-001			
20L	Integrated Circuit, 74F138	137521-001			
20N	Integrated Circuit, 74F163	137345-001			
20P	PROM, 82S147	136092-0001			
20R/S	Integrated Circuit, CPU, PLCC	137658-101			
21F	Integrated Circuit, 74LS378	137305-001			
21L	GAL16V8, 25 ns	136092-0006			
21N	Integrated Circuit, 74F163	137345-001			
21P	PROM, 82S147	136092-0003			
22C	EPROM, 200 ns, 128K x 8	136092-0032			
22D	EPROM, 200 ns, 128K x 8	136092-0031			
22J	EPROM, 200 ns, 128K x 8	136092-0030			
22L	Integrated Circuit, 74LS151	137101-001			
22N	Integrated Circuit, 74F163	137345-001			
22P	PROM, 82S147	136092-0002			
22R	Integrated Circuit, 74LS379	137374-001			

Guardians of the 'Hood Game PCB Assembly

Parts List, Continued

Designator	Description	Part No.	Designator	Description	Part No.
Diodes			R82, R83	Resistor, 470 Ω , $\pm 5\%$, 1/8 W	110027-471
CR1, CR2	Diode, 1N4001	131048-001	R84, R85	Resistor, 1 K Ω , $\pm 5\%$, 1/8 W	110027-102
CR3	Diode, MV5053, Light-Emitting	131027-002	R86	Resistor, 470 Ω , $\pm 5\%$, 1/8 W	110027-471
Test Points, Connectors, and Inductors			R87	Resistor, 1 K Ω , $\pm 5\%$, 1/8 W	110027-102
GND1, 2	Test Point	179051-001	R88-R90	Resistor, 470 Ω , $\pm 5\%$, 1/8 W	110027-471
J1	Connector, 11 Circuit, Header, .100 Ctr, Key 2	179118-011	R91-R93	Resistor, 1 K Ω , $\pm 5\%$, 1/8 W	110027-102
J4, J9, J10	Connector, 2 Circuit, Header, .100 Ctr	179048-002	R94	Resistor, 220 Ω , $\pm 5\%$, 1/8 W	110027-221
JAUD	Connector, 36 Ckt, .1 Header, Long	179300-036	R95, R96	Resistor, 100 Ω , $\pm 5\%$, 1/8 W	110027-101
JPL3	Connector, 15 Ckt, Header, .100 Ctr	179118-015	R97-R105	Resistor, 10 K Ω , $\pm 5\%$, 1/8 W	110027-103
JSYNC	Connector, 3 Ckt, Header, .100 Ctr	179048-003	R106	Resistor, 240 Ω , $\pm 5\%$, 1/8 W	110027-241
STEST	Connector, 2 Circuit, Header, .100 Ctr	179048-002	R107	Resistor, 100 K Ω , $\pm 5\%$, 1/8 W	110027-104
VCR	Connector, 2 Circuit, Header, .100 Ctr	179048-002	R108	Resistor, 10 K Ω , $\pm 5\%$, 1/8 W	110027-103
WDOG	Connector, 2 Circuit, Header, .100 Ctr	179048-002	R110-R112	Resistor, 1 K Ω , $\pm 5\%$, 1/8 W	110027-102
L1	Inductor, 100 μ H	141024-001	R113, R117, R118	Resistor, 10 Ω , $\pm 5\%$, 1/8 W	110027-100
Transistors			R119-R121	Resistor, 1 K Ω , $\pm 5\%$, 1/8 W	110027-102
Q1-Q3	Transistor, 2N3904	133041-001	R122	Resistor, 10 Ω , $\pm 5\%$, 1/8 W	110027-100
Q4-Q7	Transistor, 2N5306	133033-001	R123-R125	Resistor, 10 K Ω , $\pm 5\%$, 1/8 W	110027-103
Q8	Transistor, 2N3904	133041-001	R126	Resistor, 10 Ω , $\pm 5\%$, 1/8 W	110027-100
Resistors			R127	Resistor, 10 K Ω , $\pm 5\%$, 1/8 W	110027-103
R1	Resistor, 100 Ω , $\pm 5\%$, 1/8 W	110027-101	R128-R130	Resistor, 1 K Ω , $\pm 5\%$, 1/8 W	110027-102
R2	Resistor, 15 Ω , $\pm 5\%$, 1/8 W	110027-150	R131	Resistor, 100 Ω , $\pm 5\%$, 1/8 W	110027-101
R3	Resistor, 100 Ω , $\pm 5\%$, 1/8 W	110027-101	R132, R133	Resistor, 10 K Ω , $\pm 5\%$, 1/8 W	110027-103
R4	Resistor, 15 Ω , $\pm 5\%$, 1/8 W	110027-150	R134	Resistor, 100 Ω , $\pm 5\%$, 1/8 W	110027-101
R5	Resistor, 100 Ω , $\pm 5\%$, 1/8 W	110027-101	R135	Resistor, 470 Ω , $\pm 5\%$, 1/8 W	110027-471
R6	Resistor, 15 Ω , $\pm 5\%$, 1/8 W	110027-150	R136	Resistor, 10 K Ω , $\pm 5\%$, 1/8 W	110027-103
R7-R9	Resistor, 470 Ω , $\pm 5\%$, 1/8 W	110027-471	R137, R139, R140	Resistor, 10 Ω , $\pm 5\%$, 1/8 W	110027-100
R10	Resistor, 2.4 K Ω , $\pm 5\%$, 1/8 W	110027-242	R141	Resistor, 1 K Ω , $\pm 5\%$, 1/8 W	110027-102
R11	Resistor, 1 K Ω , $\pm 5\%$, 1/8 W	110027-102	R143, R144	Resistor, 10 Ω , $\pm 5\%$, 1/8 W	110027-100
R12	Resistor, 10 Ω , $\pm 5\%$, 1/8 W	110027-100	R145-R150	Resistor, 1 K Ω , $\pm 5\%$, 1/8 W	110027-102
R13	Resistor, 2.4 K Ω , $\pm 5\%$, 1/8 W	110027-242	R151	Resistor, 470 Ω , $\pm 5\%$, 1/8 W	110027-471
R14	Resistor, 1 K Ω , $\pm 5\%$, 1/8 W	110027-102	Crystals		
R15	Resistor, 10 Ω , $\pm 5\%$, 1/8 W	110027-100	X1	Crystal, 20.000 MHz	144000-003
R16	Resistor, 2.4 K Ω , $\pm 5\%$, 1/8 W	110027-242	X2	Crystal, 14.318 MHz	144000-004
R17	Resistor, 1 K Ω , $\pm 5\%$, 1/8 W	110027-102			
R18	Resistor, 10 Ω , $\pm 5\%$, 1/8 W	110027-100			
R19	Resistor, 0 Ω , $\pm 5\%$, 1/4 W	110005-001			
R20-R45	Resistor, 1 K Ω , $\pm 5\%$, 1/8 W	110027-102			
R46-R48, R50, R52-R65	Resistor, 470 Ω , $\pm 5\%$, 1/8 W	110027-471			
R66, R67	Resistor, 10 K Ω , $\pm 5\%$, 1/8 W	110027-103			
R68, R69	Resistor, 470 Ω , $\pm 5\%$, 1/8 W	110027-471			
R70-R73	Resistor, 1 K Ω , $\pm 5\%$, 1/8 W	110027-102			
R74-, R77	Resistor, 470 Ω , $\pm 5\%$, 1/8 W	110027-471			
R78-R81	Resistor, 1 K Ω , $\pm 5\%$, 1/8 W	110027-102			

NOTES



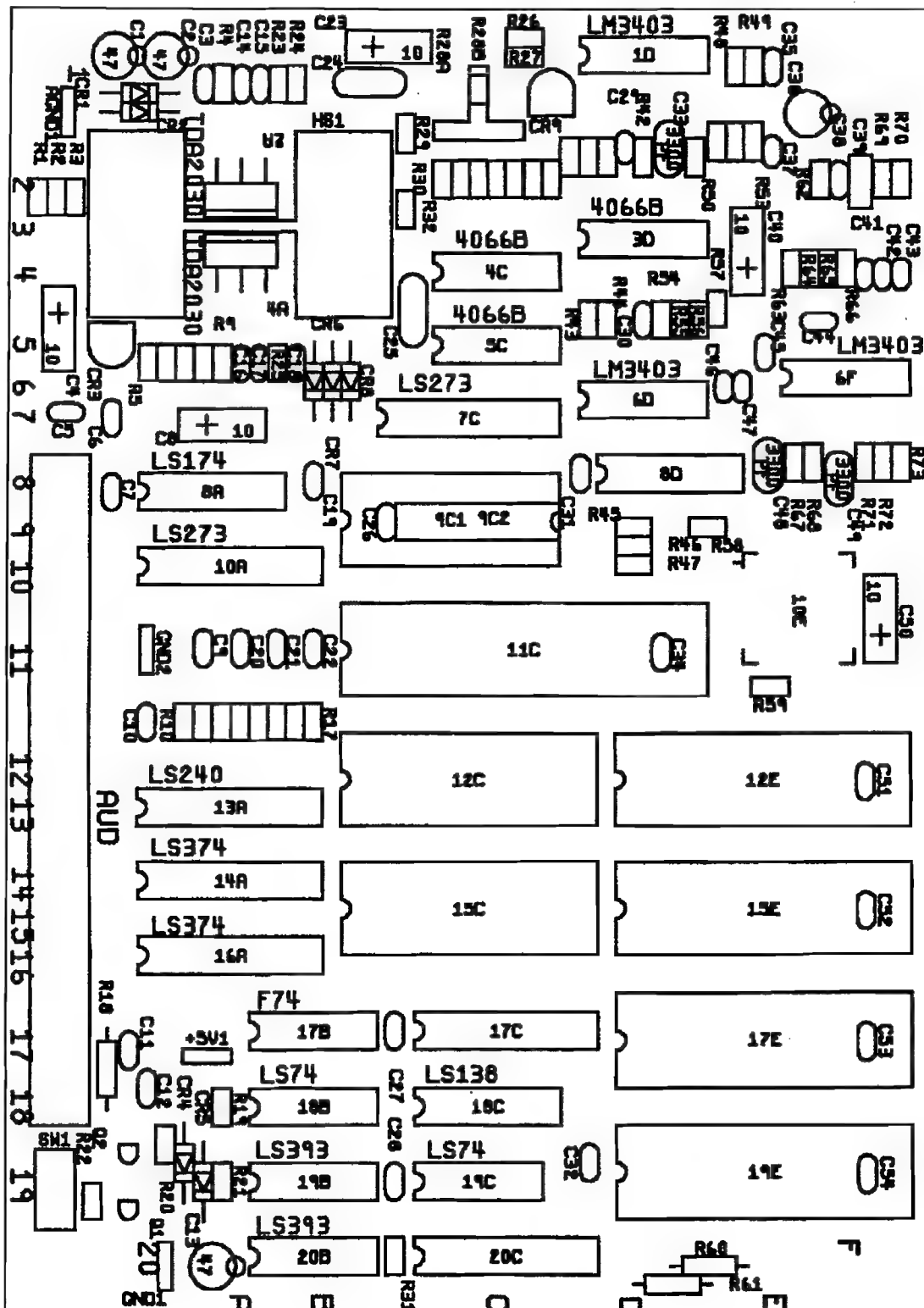


Figure 4-7 JSA Audio III PCB Assembly

A048974-10 A

JSA III PCB Assembly Parts List

Designator	Description	Part No.	Designator	Description	Part No.
Sockets					
8D	Socket, 16 Pin, .300	179259-016	16A	Integrated Circuit, 74LS374	137144-001
9C1	Socket, 24 Pin, .600	179257-024	17B	Integrated Circuit, 74F74	137436-001
11C	Socket, 40 Pin, .600	179257-040	17C	GAL16V8, 25 ns	136085-1038
12C	Socket, 28 Pin, .600	179257-028	17E	EPROM, 200 ns, 128K x 8	136089-1049
12E	Socket, 32 Pin, .600	179257-032	18B	Integrated Circuit, 74LS74	137023-001
15C	Socket, 28 Pin, .600	179257-028	18C	Integrated Circuit, 74LS138	137177-001
15E	Socket, 32 Pin, .600	179257-032	19B	Integrated Circuit, 74LS393	137146-001
17C	Socket, 20 Pin, .300	179259-020	19C	Integrated Circuit, 74LS74	137023-001
17E, 19E	Socket, 32 Pin, .600	179257-032	19E	EPROM, 150 ns, 128K x 8	136092-0081
20C	Socket, 20 Pin, .300	179259-020	20B	Integrated Circuit, 74LS393	137146-001
			20C	GAL16V8, 25 ns	136085-2046
Miscellaneous Hardware			Capacitors		
++1005V1	Test Point	179051-001	C1,C2	Capacitor, 47 μ F, 50V, Electrolytic	123015-476
AGND1	Test Point	179051-001	C3	Capacitor, .1 μ F, 50 V, +80%-20%, Ceramic	122002-104
GND1,GND2	Test Point	179051-001	C4	Capacitor, 10 μ F, 25 V, Electrolytic	124009-106
—	Nut/Washer Assy.	177026-0036	C5-C7	Capacitor, .1 μ F, 50 V, +80%-20%, Ceramic	122002-104
HS1	Heat Sink, TDA2030	178190-032	C8	Capacitor, 10 μ F, 25 V, Electrolytic	124009-106
JAUD	Connector, 36 Ckt, .1 Bottom Entry	179299-036	C9, C10	Capacitor, .1 μ F, 50 V, +80%-20%, Ceramic	122002-104
SW1	Switch, Slide, SPDT	160040-001	C13	Capacitor, 47 μ F, 50V, Electrolytic	123015-476
—	Nut/Washer, Zinc	177026-0036	C14-C22	Capacitor, .1 μ F, 50 V, +80%-20%, Ceramic	122002-104
—	Screw, Pan-Head, #6-32x3/8,	72-1606S	C23	Capacitor, 10 μ F, 25 V, Electrolytic	124009-106
—	Cross-Recessed, Cadmium	107031-001	C24, C25	Capacitor, .22 μ F, 50 V, \pm 10%, Ceramic	122015-224
—	Thermal Compound	107031-001	C26-C28	Capacitor, .1 μ F, 50 V, +80%-20%, Ceramic	122002-104
Integrated Circuits			C29	Capacitor, 1000 pF, 50 V, \pm 10%, Ceramic	122015-102
1D	Integrated Circuit, Quad Op-Amp, LM3403	137673-001	C30-C32	Capacitor, .1 μ F, 50 V, +80%-20%, Ceramic	122002-104
2A	Integrated Circuit, TDA2030	137301-001	C33	Capacitor, 3300 pF, 50 V, \pm 5%, NPO, +80%-20%	122019-332
3D	Integrated Circuit, 4066B	137580-001	C34, C35	Capacitor, .1 μ F, 50 V, +80%-20%, Ceramic	122002-104
4A	Integrated Circuit, TDA2030	137301-001	C37	Capacitor, 2200 pF, 50 V, +80%-10%, Ceramic	122015-222
4C, 5C	Integrated Circuit, 4066B	137580-001	C38	Capacitor, .1 μ F, 50 V, +80%-20%, Ceramic	122002-104
6D, 6F	Integrated Circuit, Quad Op-Amp, LM3403	137673-001	C39	Capacitor, .015 μ F, 100 V, \pm 5%, Poly	126009-153
7C	Integrated Circuit, 74LS273	137040-001	C40	Capacitor, 10 μ F, 25 V, Electrolytic	124009-106
8A	Integrated Circuit, 74LS174	137122-001	C41	Capacitor, 1000 pF, 50 V, \pm 10%, Ceramic	122015-102
8D	Integrated Circuit, YM3012	137402-001	C42, C43	Capacitor, 6800 pF, 50 V, 80%-10%, Ceramic	122015-682
9C1	Integrated Circuit, YM2151	137401-001			
10A	Integrated Circuit, 74LS273	137040-001			
11C	Integrated Circuit, 6502 A	137577-001			
12C	EPROM, 200 ns, 64K x 8	136092-0080			
12E	EPROM, 200 ns, 128K x 8	136089-1051			
13A	Integrated Circuit, 74LS240	137251-001			
14A	Integrated Circuit, 74LS374	137144-001			
15C	Integrated Circuit, RAM, 8K x 8, 100 ns, .6	137535-004			
15E	EPROM, 200 ns, 128K x 8	136089-1050			

JSA III PCB Assembly Parts List, Continued

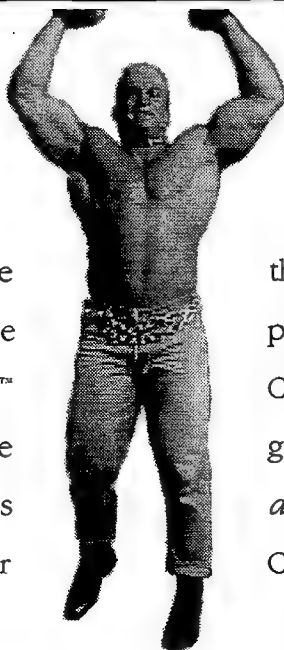
Designator	Description	Part No.	Designator	Description	Part No.
C44, C45	Capacitor, .1 μ F, 50 V, +80%-20%, Ceramic	122002-104	R37	Resistor, 160 K Ω , $\pm 5\%$, 1/8 W	110027-164
C46, C47	Capacitor, 1000 pF, 50 V, $\pm 10\%$, Ceramic	122015-102	R38	Resistor, 10 K Ω , $\pm 5\%$, 1/8 W	110027-103
C48, C49	Capacitor, 3300 pF, 50 V, $\pm 5\%$, NPO	122019-332	R40	Resistor, 30 K Ω , $\pm 5\%$, 1/8 W	110027-303
C50	Capacitor, 10 μ F, 25 V, Electrolytic	124009-106	R41	Resistor, 15 K Ω , $\pm 5\%$, 1/8 W	110027-153
C51-C54	Capacitor, .1 μ F, 50 V, +80%-20%, Ceramic	122002-104	R42	Resistor, 150 K Ω , $\pm 5\%$, 1/8 W	110027-154
			R43	Resistor, 7.5 K Ω , $\pm 5\%$, 1/8 W	110027-752
	Diodes		R44	Resistor, 15 K Ω , $\pm 5\%$, 1/8 W	110027-153
CR1, CR2	Diode, 1N4001	131048-001	R48	Resistor, 3.3 K Ω , $\pm 5\%$, 1/8 W	110027-332
CR3	Diode, MV5053, Light-Emitting	131027-002	R49	Resistor, 33 K Ω , $\pm 5\%$, 1/8 W	110027-333
CR6-CR8	Diode, 1N4001	131048-001	R50	Resistor, 30 K Ω , $\pm 5\%$, 1/8 W	110027-303
CR9	Diode, MV5053, Light-Emitting	131027-002			
	Resistors		R51	Resistor, 6.2 K Ω , $\pm 5\%$, 1/8 W	110027-622
R1, R2	Resistor, 10 K Ω , $\pm 5\%$, 1/8 W	110027-103	R52, R53	Resistor, 12 K Ω , $\pm 5\%$, 1/8 W	110027-123
R3	Resistor, 33 K Ω , $\pm 5\%$, 1/8 W	110027-333	R54	Resistor, 7.5 K Ω , $\pm 5\%$, 1/8 W	110027-752
R4	Resistor, 1 Ω , $\pm 5\%$, 1/8 W	110027-010	R55	Resistor, 560 Ω , $\pm 5\%$, 1/8 W	110027-561
R5	Resistor, 33 K Ω , $\pm 5\%$, 1/8 W	110027-333	R56	Resistor, 470 Ω , $\pm 5\%$, 1/8 W	110027-471
R6	Resistor, 470 Ω , $\pm 5\%$, 1/8 W	110027-471	R57	Resistor, 100 Ω , $\pm 5\%$, 1/8 W	110027-101
R7	Resistor, 33 K Ω , $\pm 5\%$, 1/8 W	110027-333	R59	Resistor, 10 Ω , $\pm 5\%$, 1/8 W	110027-100
R8	Resistor, 1 K Ω , $\pm 5\%$, 1/8 W	110027-102	R62	Resistor, 15 K Ω , $\pm 5\%$, 1/8 W	110027-153
R9	Resistor, 33 K Ω , $\pm 5\%$, 1/8 W	110027-333	R63	Resistor, 10 K Ω , $\pm 5\%$, 1/8 W	110027-103
R10	Resistor, 470 Ω , $\pm 5\%$, 1/8 W	110027-471	R64	Resistor, 15 K Ω , $\pm 5\%$, 1/8 W	110027-153
R11	Resistor, 1 K Ω , $\pm 5\%$, 1/8 W	110027-102	R65	Resistor, 7.5 K Ω , $\pm 5\%$, 1/8 W	110027-752
R12	Resistor, 470 Ω , $\pm 5\%$, 1/8 W	110027-471	R66	Resistor, 10 K Ω , $\pm 5\%$, 1/8 W	110027-103
R13	Resistor, 1 K Ω , $\pm 5\%$, 1/8 W	110027-102	R67	Resistor, 3.3 K Ω , $\pm 5\%$, 1/8 W	110027-332
R14	Resistor, 470 Ω , $\pm 5\%$, 1/8 W	110027-471	R68	Resistor, 6.8 K Ω , $\pm 5\%$, 1/8 W	110027-682
R15	Resistor, 1 K Ω , $\pm 5\%$, 1/8 W	110027-102	R69	Resistor, 16 K Ω , $\pm 5\%$, 1/8 W	110027-163
R16	Resistor, 470 Ω , $\pm 5\%$, 1/8 W	110027-471	R70	Resistor, 2 K Ω , $\pm 5\%$, 1/8 W	110027-202
R17, R20	Resistor, 1 K Ω , $\pm 5\%$, 1/8 W	110027-102	R71	Resistor, 6.8 K Ω , $\pm 5\%$, 1/8 W	110027-682
R22	Resistor, 470 Ω , $\pm 5\%$, 1/8 W	110027-471	R72	Resistor, 10 K Ω , $\pm 5\%$, 1/8 W	110027-103
R23	Resistor, 33 K Ω , $\pm 5\%$, 1/8 W	110027-333	R73	Resistor, 20 K Ω , $\pm 5\%$, 1/8 W	110027-203
R24	Resistor, 1 K Ω , $\pm 5\%$, 1/8 W	110027-102			
R25	Resistor, 1 Ω , $\pm 5\%$, 1/8 W	110027-010			
R26	Resistor, 1.2 K Ω , $\pm 5\%$, 1/8 W	110027-122			
R28B	Resistor, 10 Ω , $\pm 5\%$, 1/8 W	110027-100			
R29	Resistor, 5.1 K Ω , $\pm 5\%$, 1/8 W	110027-512			
R30	Resistor, 15 K Ω , $\pm 5\%$, 1/8 W	110027-153			
R31	Resistor, 10 K Ω , $\pm 5\%$, 1/8 W	110027-103			
R32	Resistor, 620 K Ω , $\pm 5\%$, 1/8 W	110027-624			
R33	Resistor, 330 K Ω , $\pm 5\%$, 1/8 W	110027-334			
R34	Resistor, 82 K Ω , $\pm 5\%$, 1/8 W	110027-823			
R35	Resistor, 20 K Ω , $\pm 5\%$, 1/8 W	110027-203			
R36	Resistor, 39 K Ω , $\pm 5\%$, 1/8 W	110027-393			



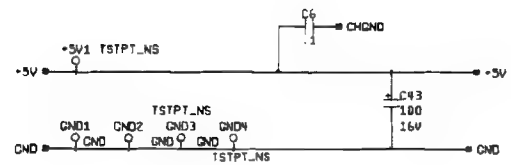
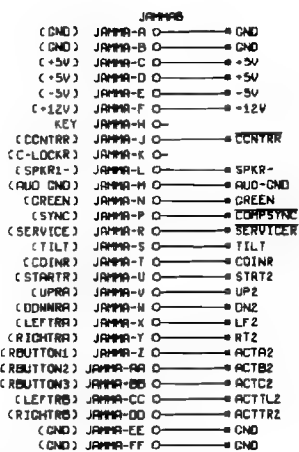
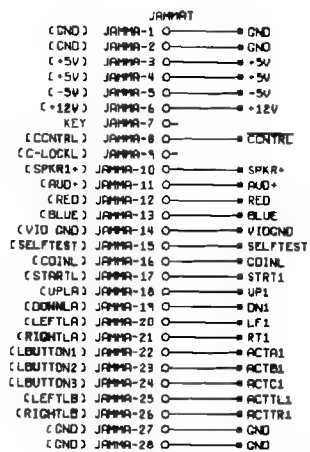
Schematic Diagrams

INTRODUCTION

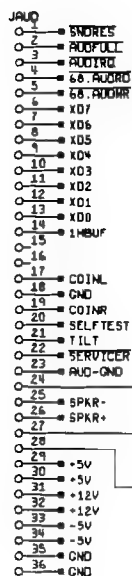
THIS CHAPTER contains the schematic diagrams for the Guardians of the 'Hood™ game printed-circuit board and the JSA Audio III PCB. In addition, this chapter includes wiring diagrams for



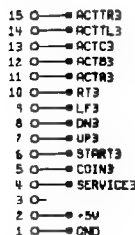
the entire game, the coin door, and the power supply, and the Hitron and Peter Chou switching power supplies. The game PCB and JSA Audio III PCB *assembly drawings* are illustrated in Chapter 4, Parts Illustrations.



GND — CHGND
CONNECTED AT FINGERS ONLY.

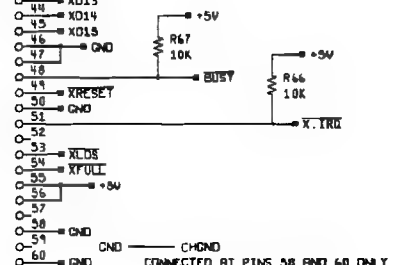
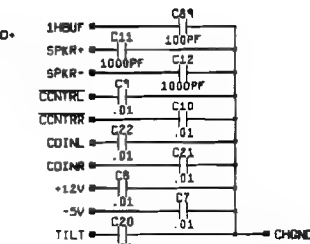
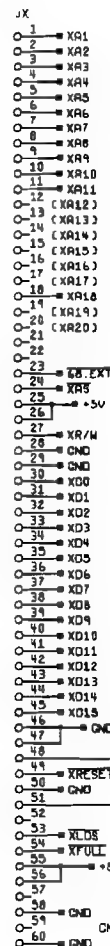
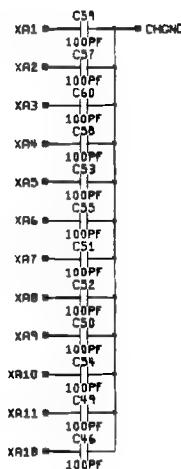


PL3/DIAG
JPL3



JSTNC

1	→	HSYNC.OUT
2	→	VSYNC.OUT
3	→	VIDGND



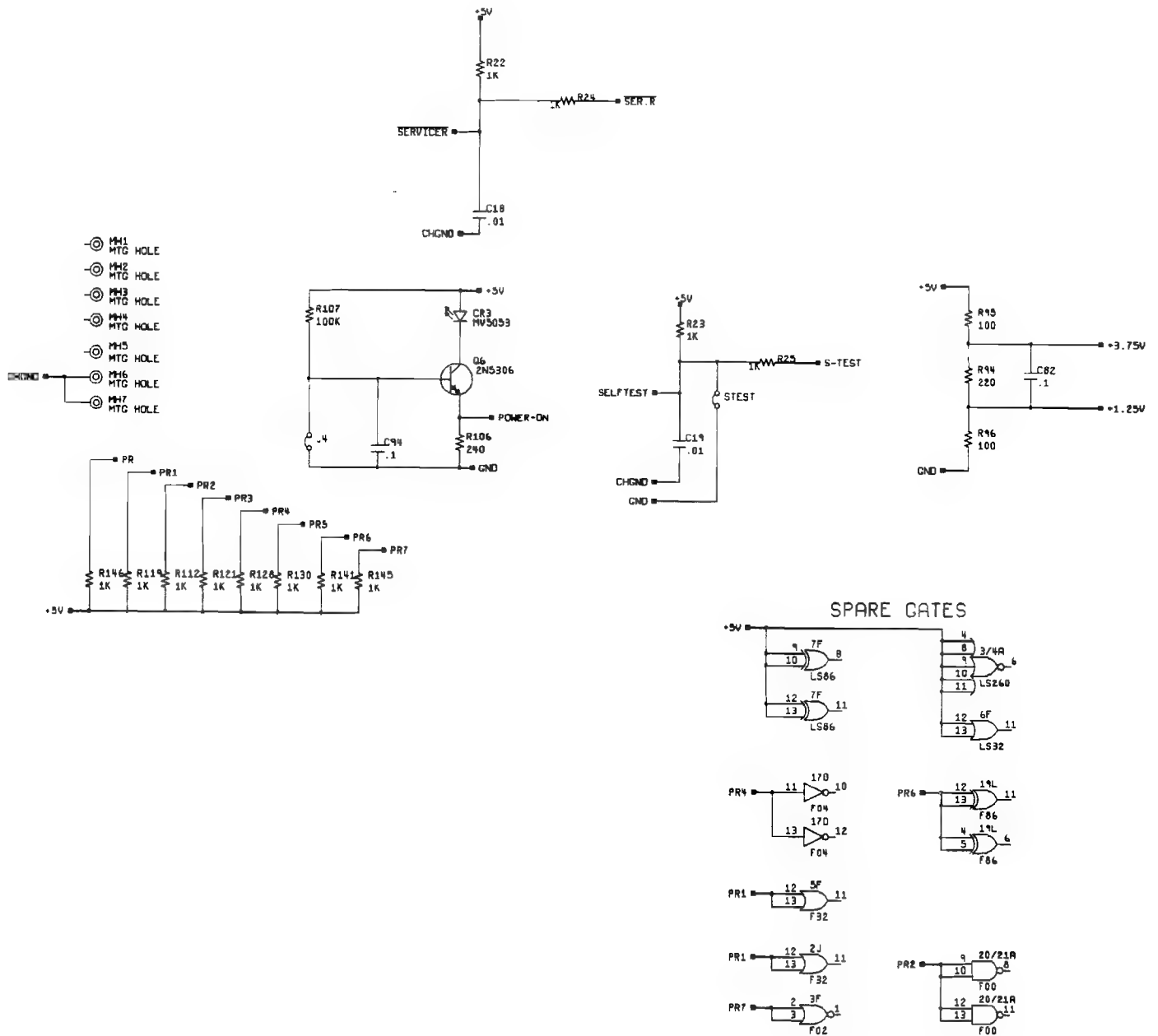
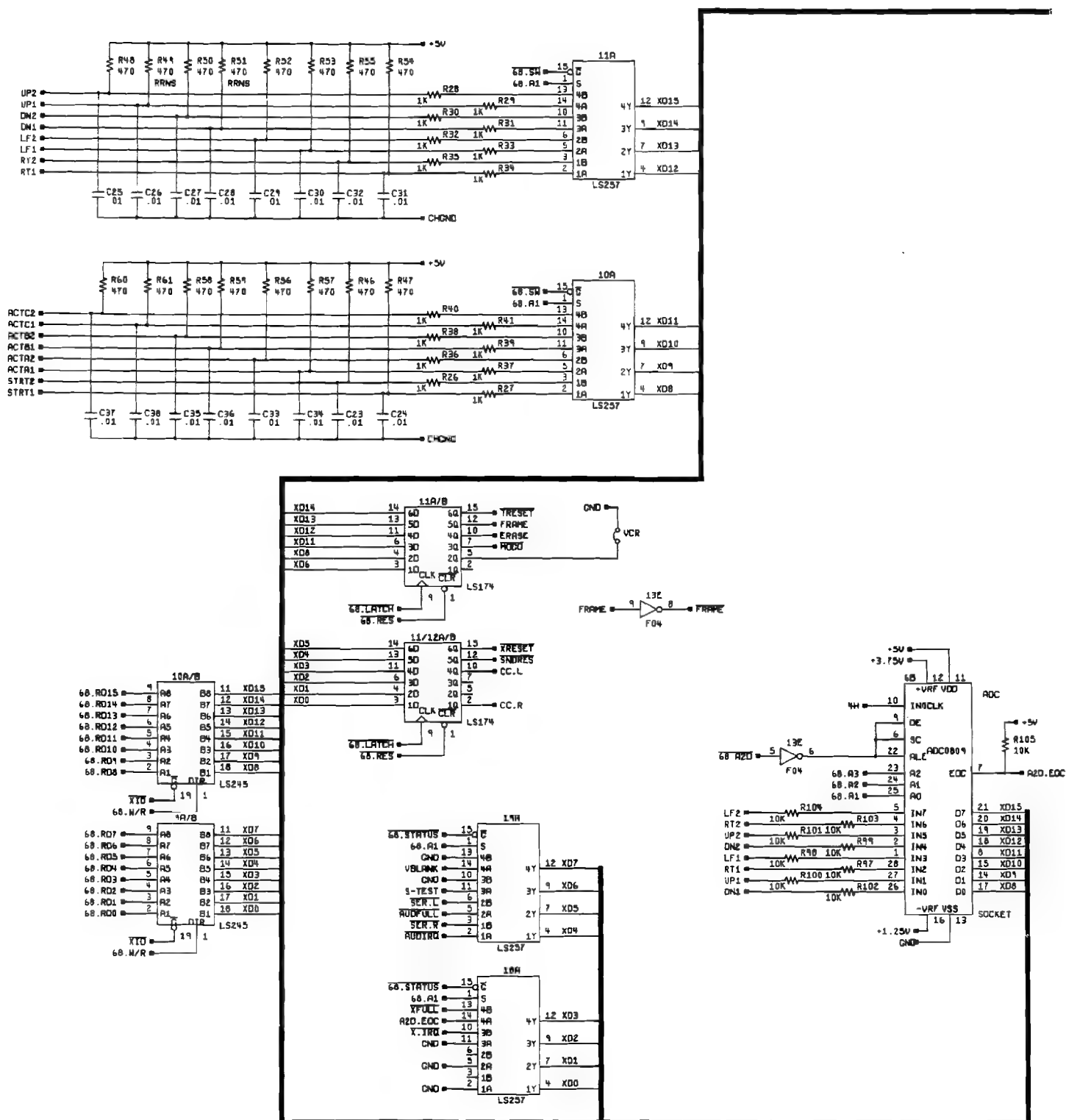
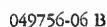


Figure 5-1 Guardians of the 'hood Game PCB Assembly Schematic Diagram

049756-06 B





5-5

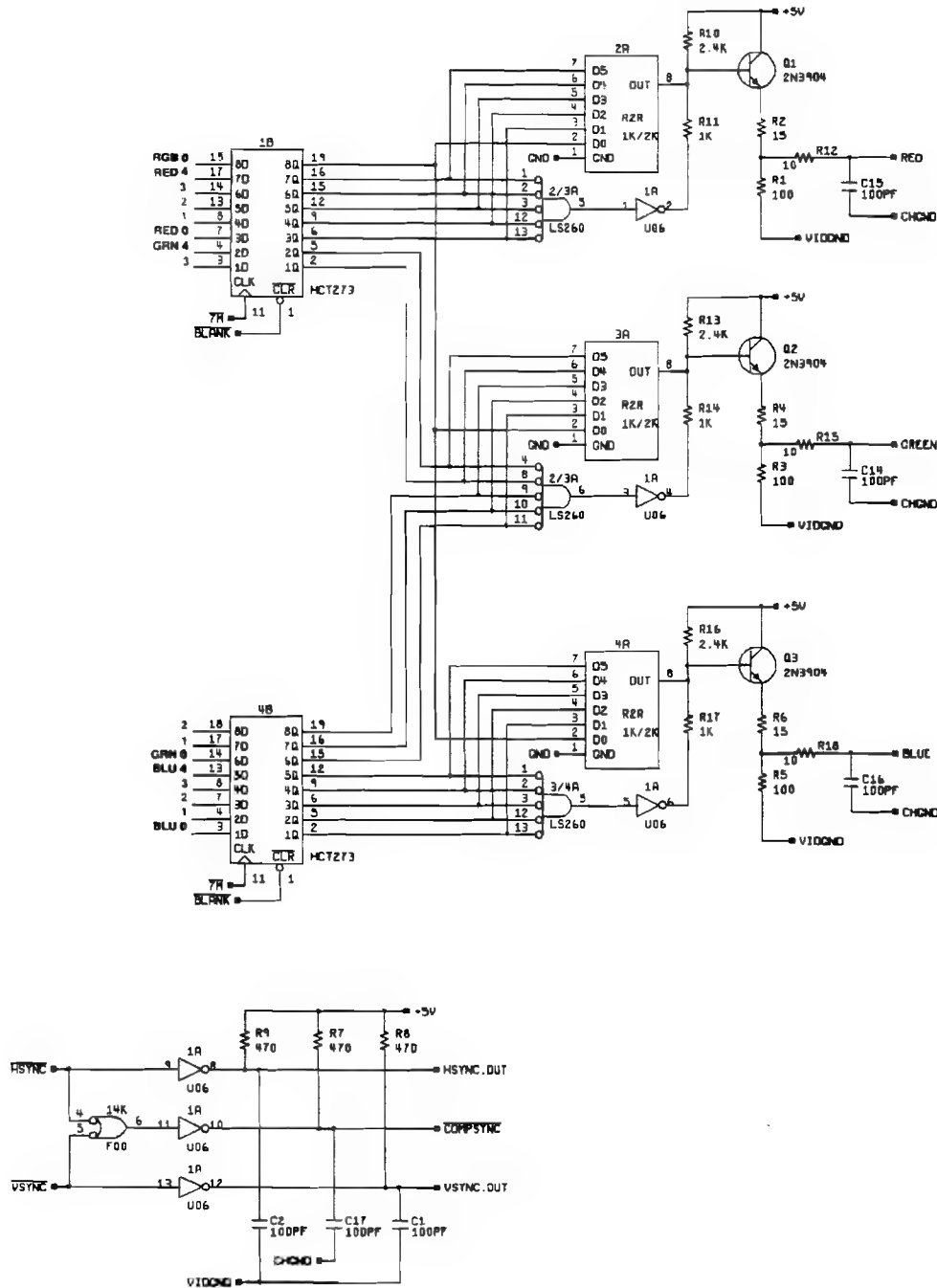


Figure 5-1 Guardians of the 'hood Game PCB Assembly Schematic Diagram

049756-06 B

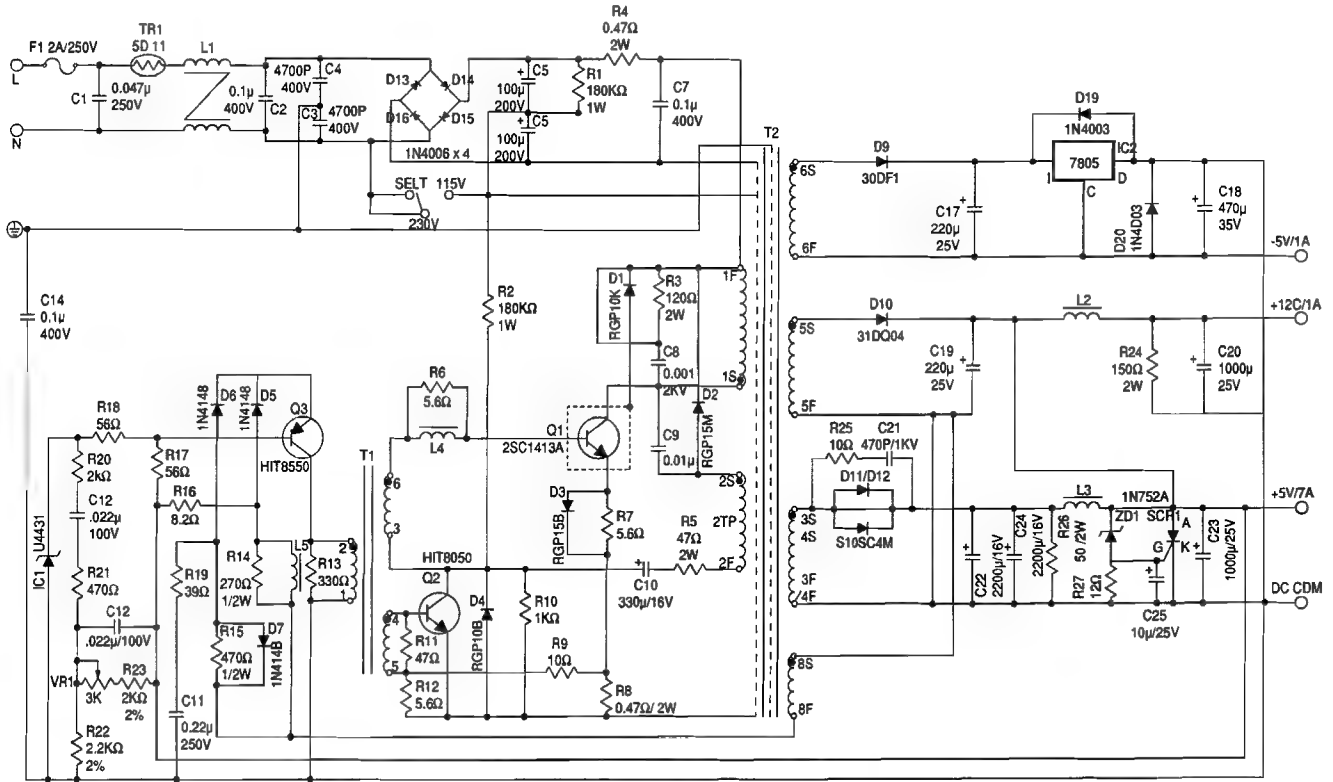


Figure 5-2 Hitron 5V, 7A Switching Power Supply (HSA-130) Schematic Diagram

149014-001

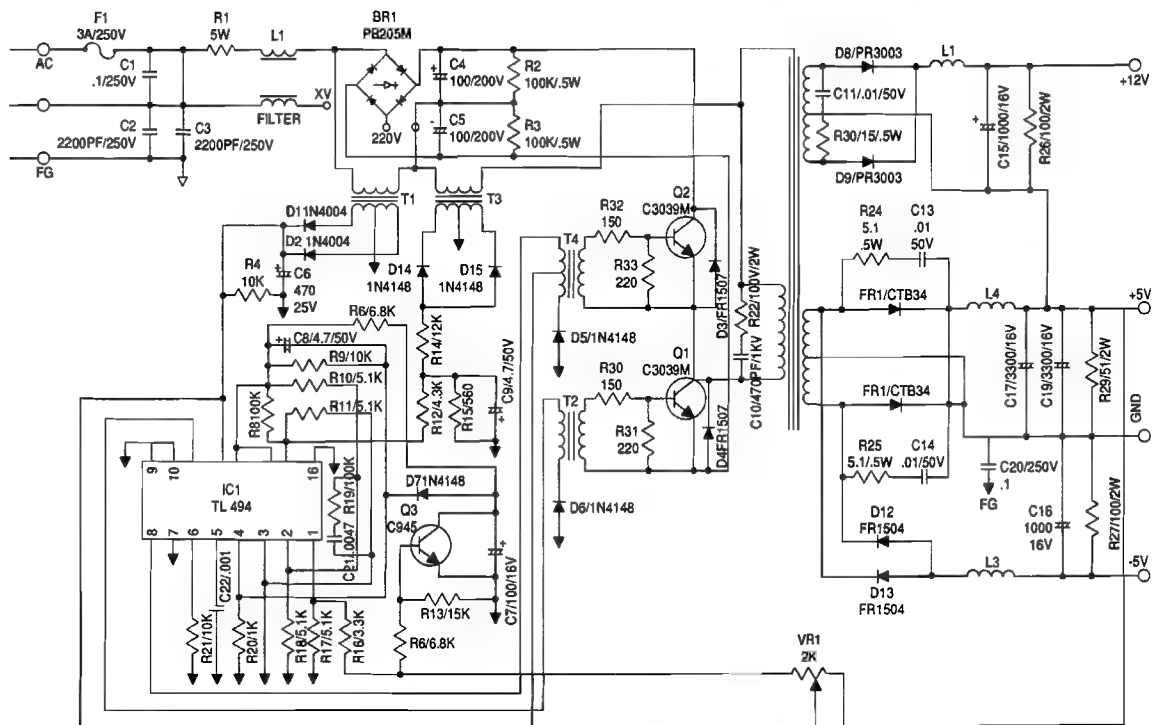
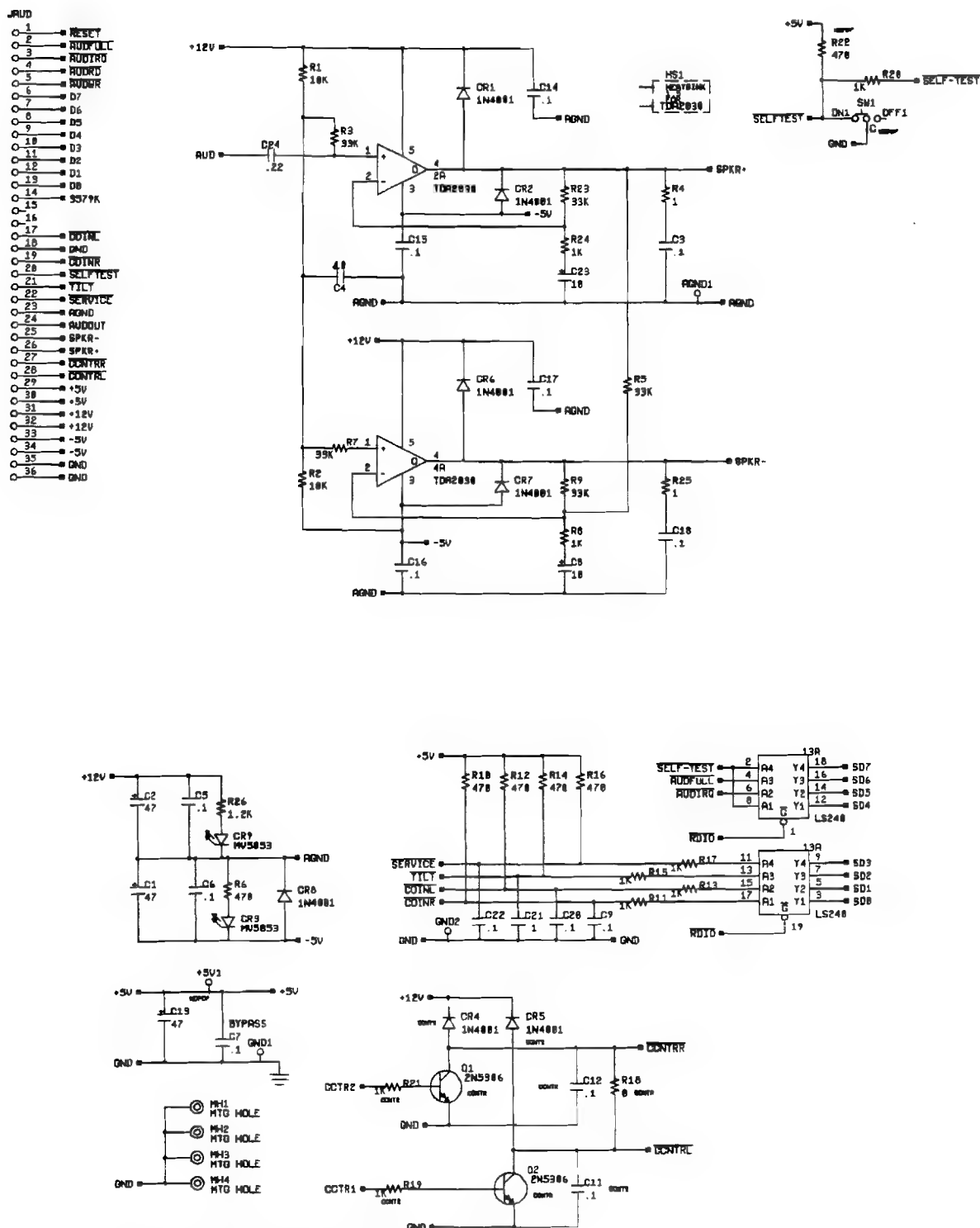


Figure 5-3 Peter Chou Power Supply Schematic Diagram (optional)

F102141288



GND AND AGND TIED INTERNALLY NEAR MSM6295

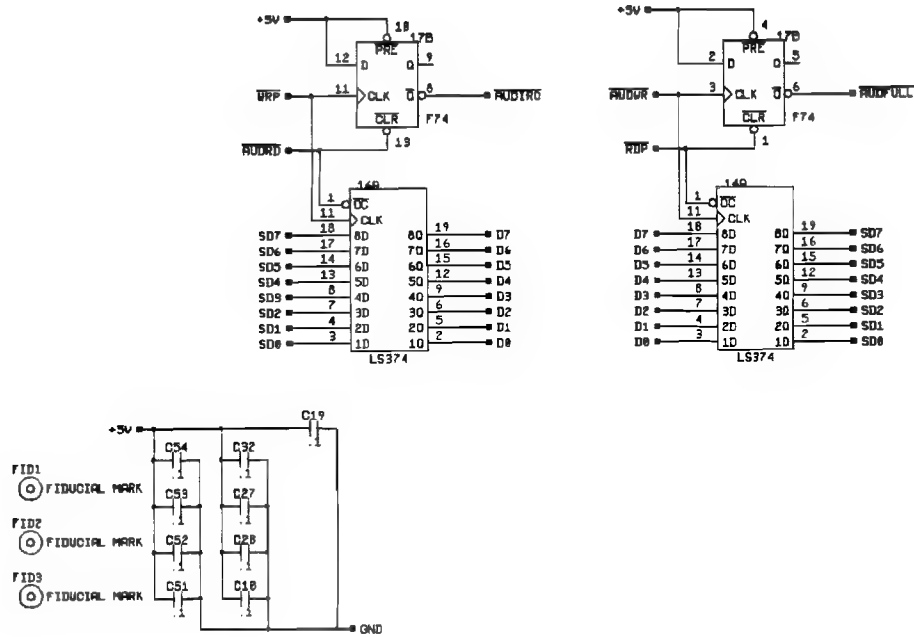
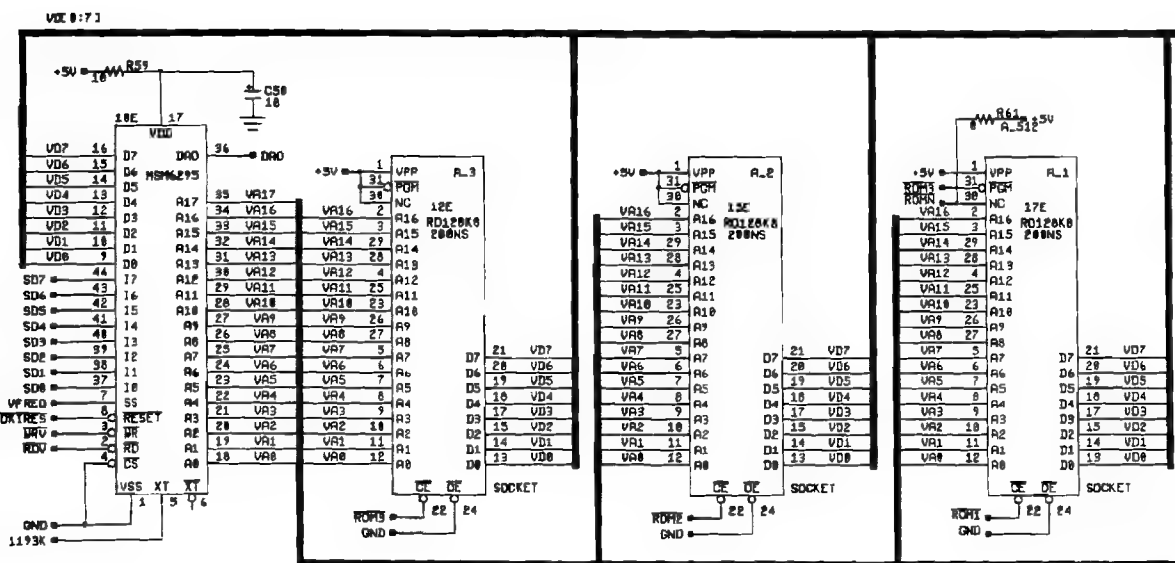


Figure 5-4 JSA Audio III PCB Assembly Schematic Diagram

048973-01 C



WFL 0:173

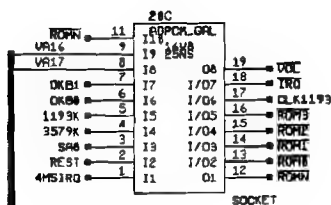
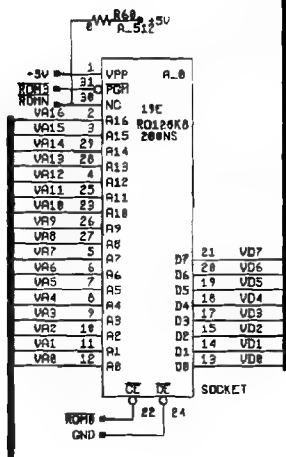
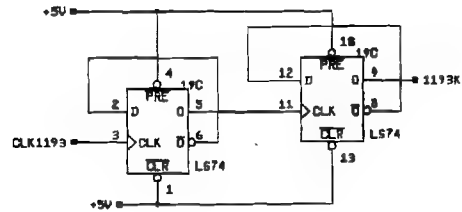
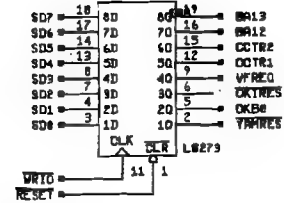
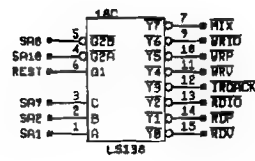
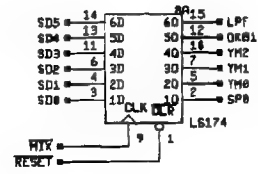
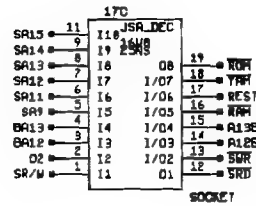
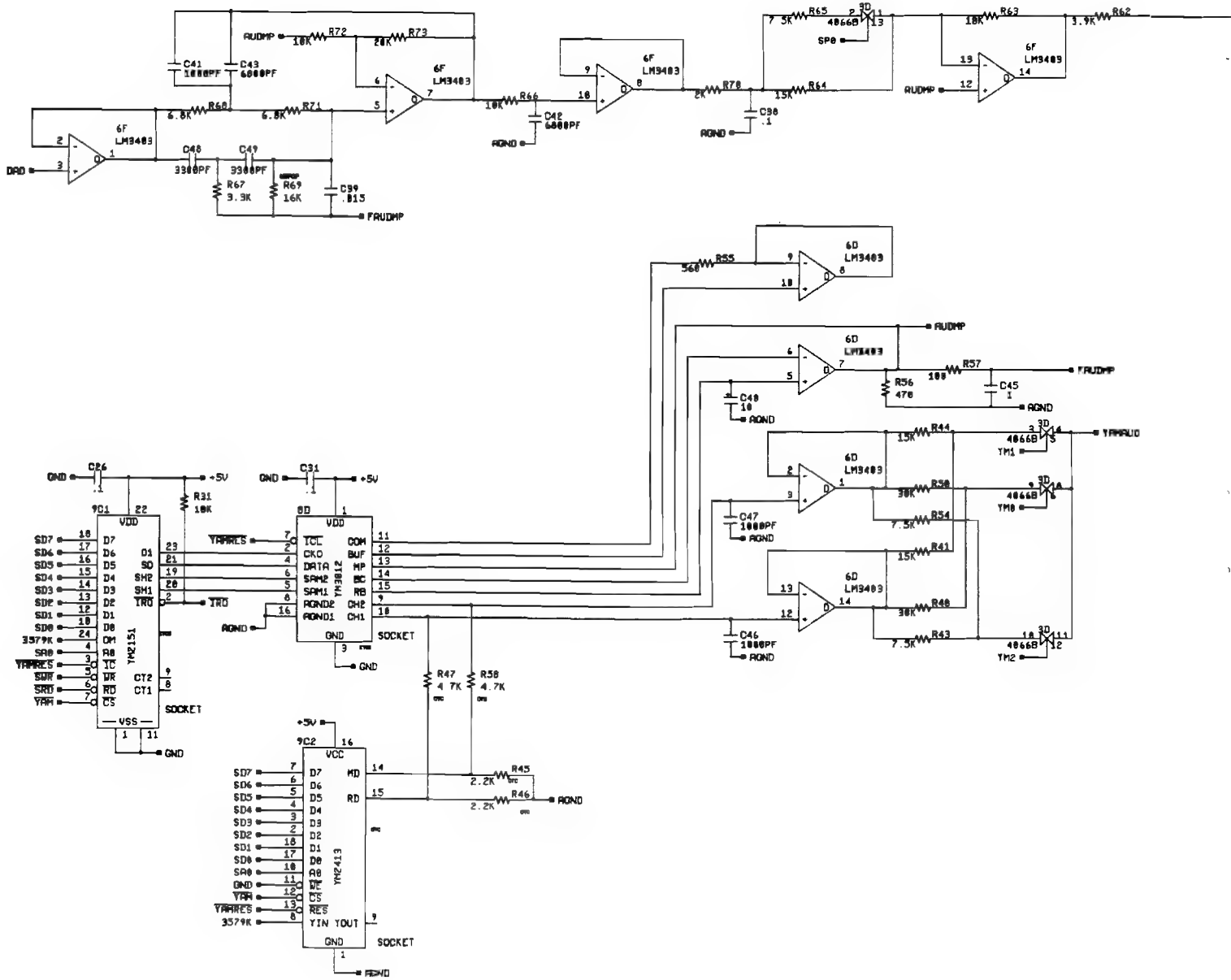


Figure 5-4 JSA Audio III PCB Assembly Schematic Diagram

048973-01 C



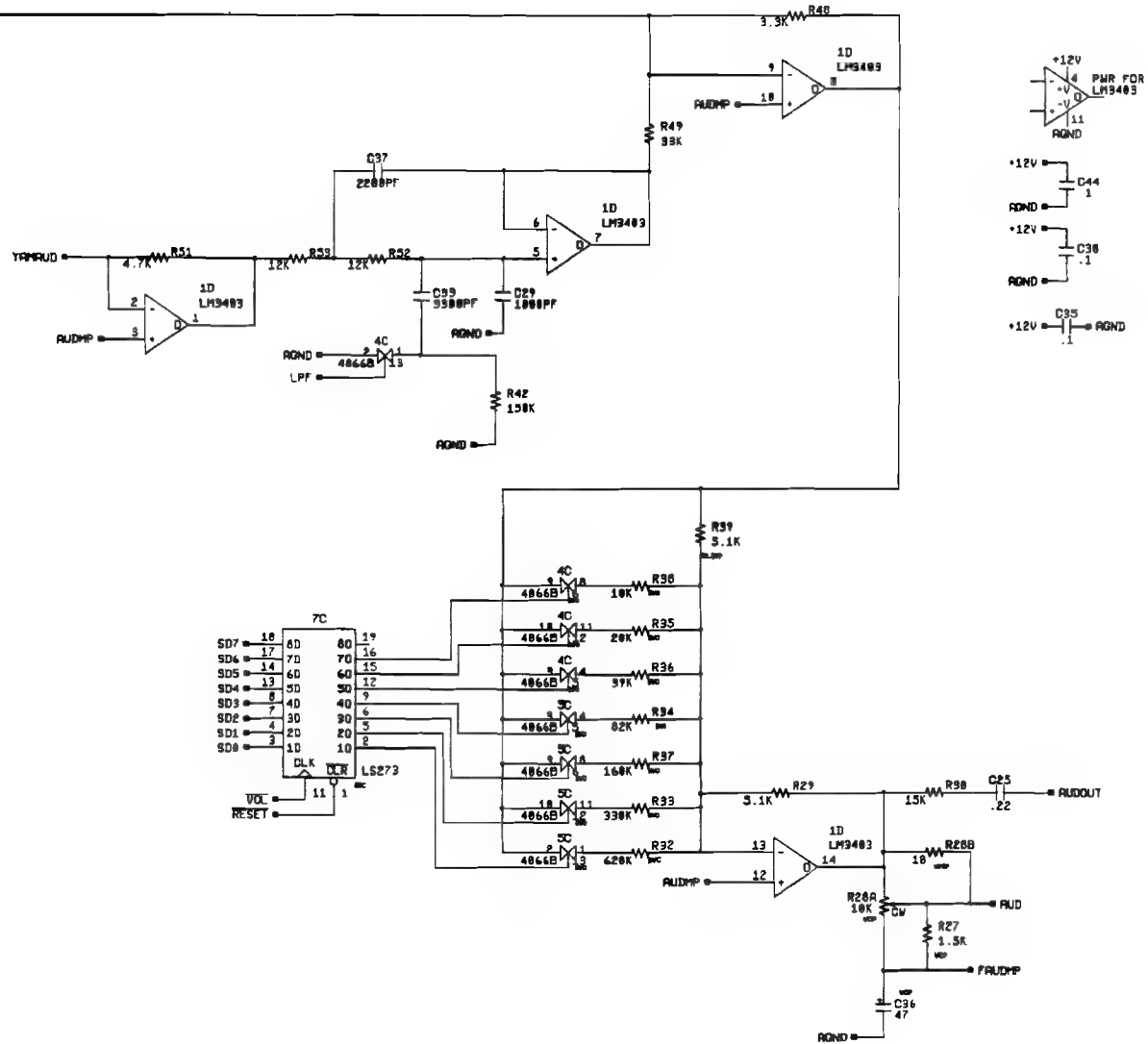
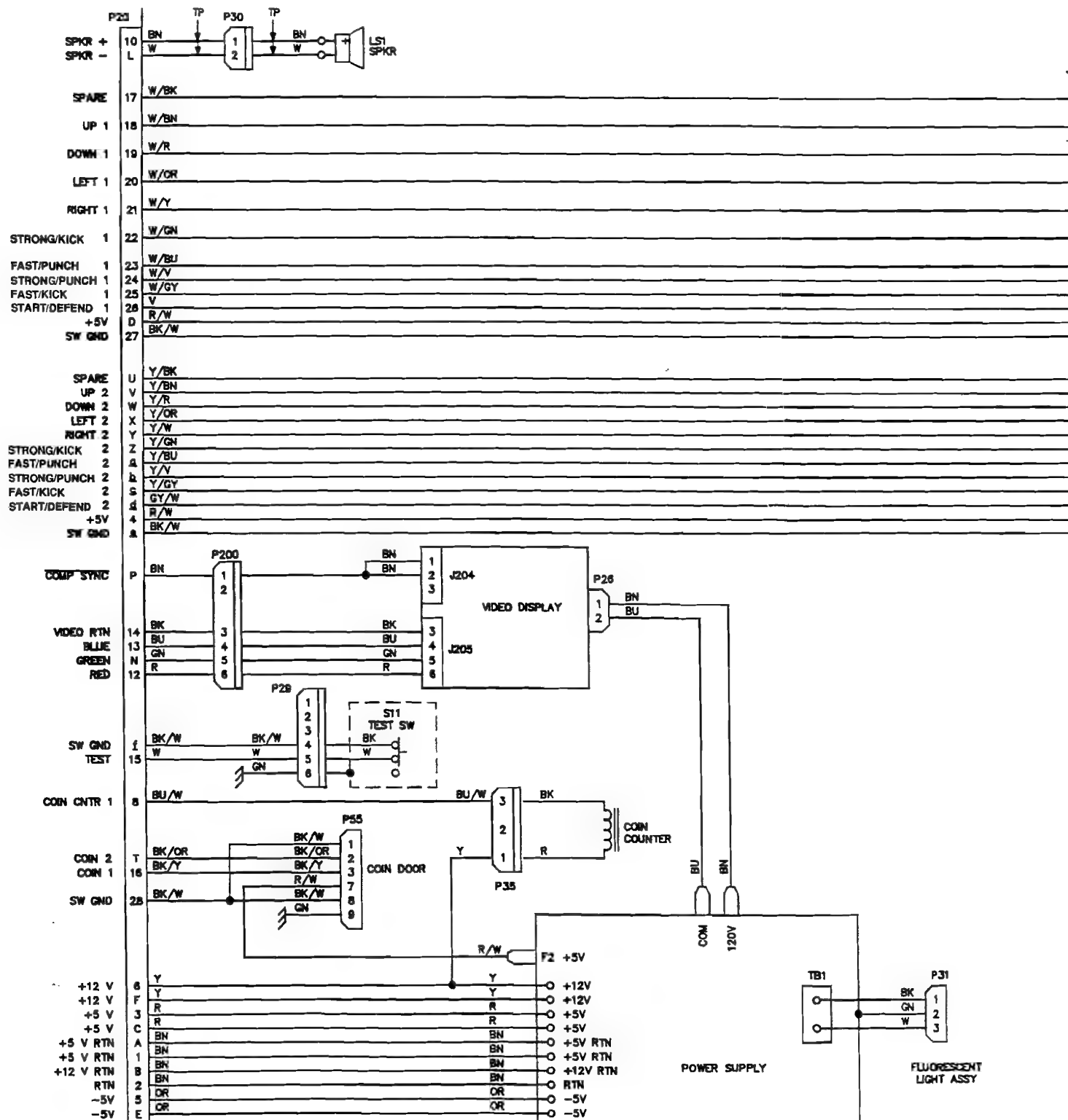


Figure 5-4 JSA Audio III PCB Assembly Schematic Diagram

048973-01 C



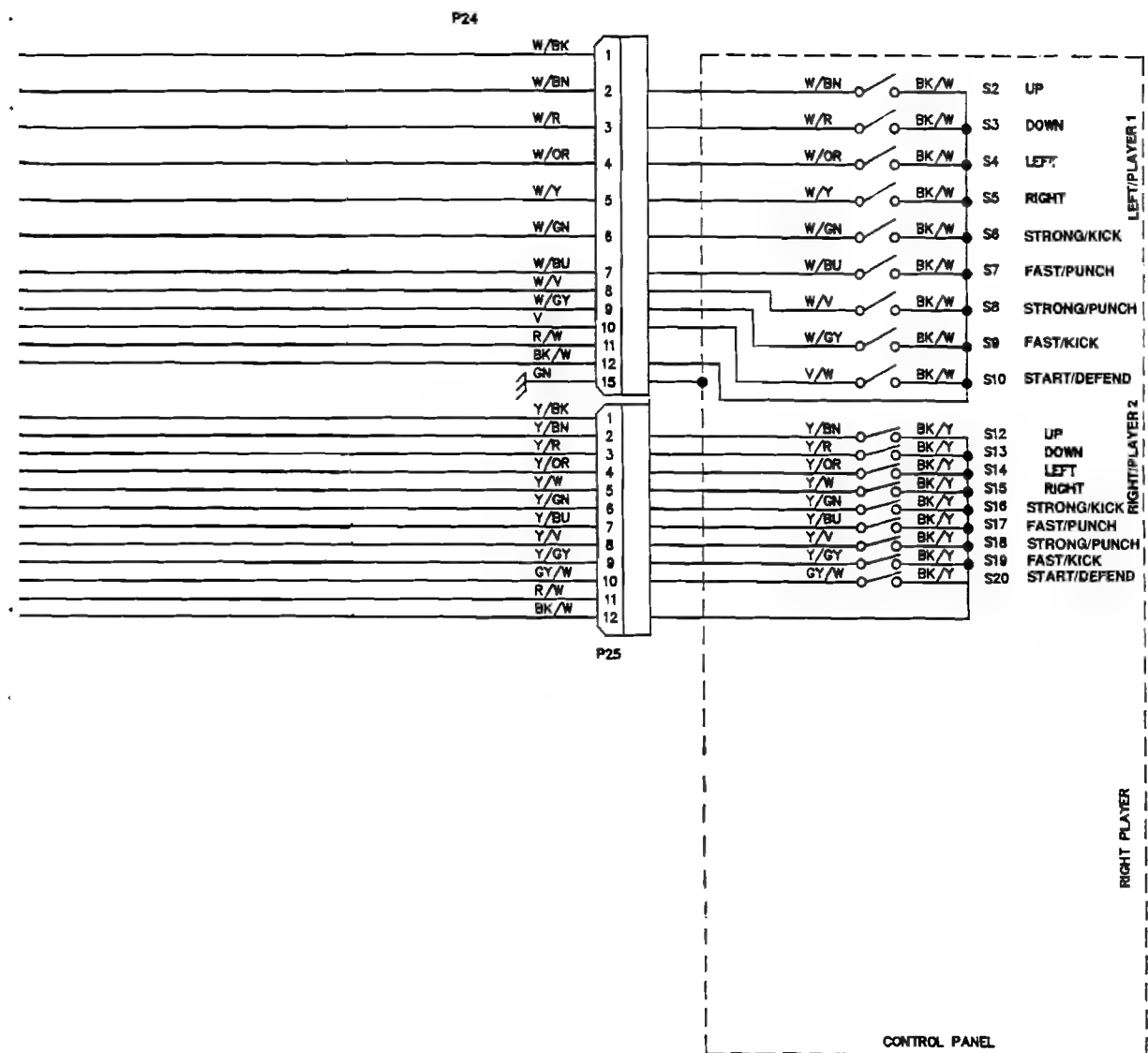


Figure 5-5 Game Main Wiring Diagram

050191-01 A

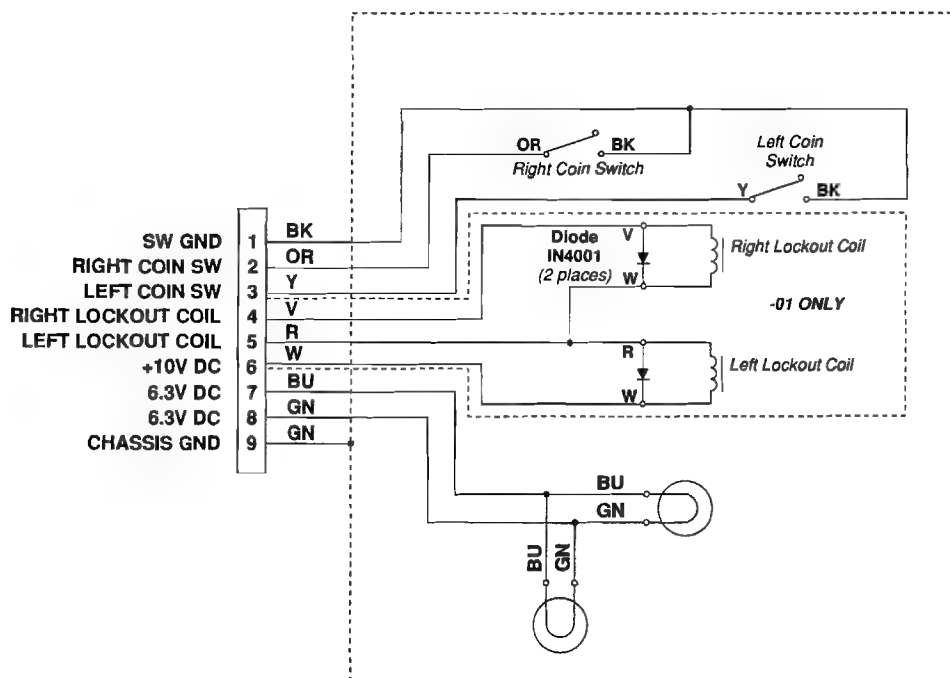


Figure 5-6 Over/Under Coin Door Wiring Diagram

A037542-XX F

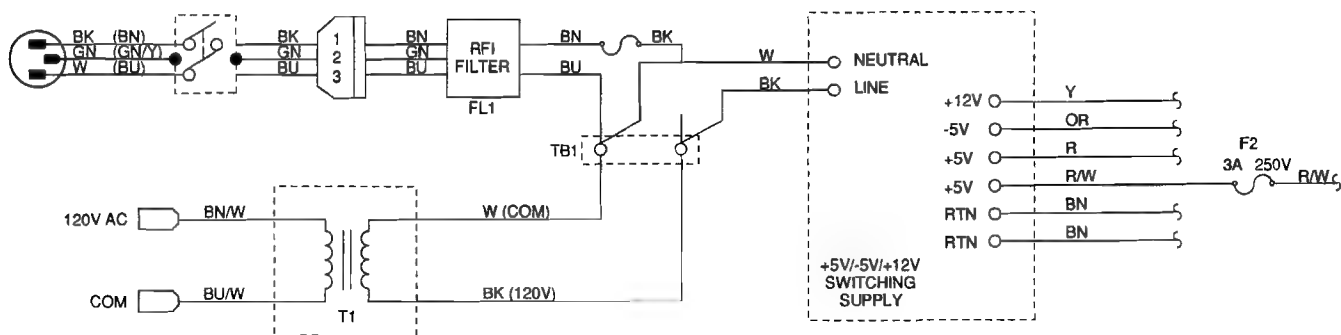


Figure 5-7 JAMMA Power Supply Wiring Diagram

049289-01 A



Guardians of the 'Hood™ Game Statistics Sheet

Location: _____

Date Recorded: _____

Meter: _____

FIRST STATISTICS SCREEN

Left Coins: _____	Sessions: _____	Total Credits: _____
Right Coins: _____	New Games: _____	Avg Time/Credit: _____
Auxiliary Coins: _____	Continued Games: _____	Average Time/New Game: _____
0 Player Mins: _____	New (Game) Mins: _____	Average Time/Cont'd Game: _____
1 Player Mins: _____	Cont'd (Game) Mins: _____	
2 Player Mins: _____	Error Count: _____	

REMAINING STATISTICS SCREENS

<i>Statistics 2: Round Counts and Average Times</i>	<i>New Game Time in Seconds</i>	<i>Continuation Game Time in Seconds</i>
Intro _____	0-39 _____	0-39 _____
Gym 1 _____	40-59 _____	40-59 _____
Alley _____	60-79 _____	60-79 _____
Movie _____	80-99 _____	80-99 _____
Gym 2 _____	100-119 _____	100-119 _____
Station _____	120-139 _____	120-139 _____
Subway Train _____	140-159 _____	140-159 _____
Gym 3 _____	160-179 _____	160-179 _____
China Street _____	180-199 _____	180-199 _____
Bar _____	200-219 _____	200-219 _____
Gym 4 _____	220-239 _____	220-239 _____
Boardwalk _____	240-259 _____	240-259 _____
Funhouse _____	260-279 _____	260-279 _____
Unused _____	280-299 _____	280-299 _____
Unused _____	300-319 _____	300-319 _____
	320-339 _____	320-339 _____
	340-359 _____	340-359 _____
	360-379 _____	360-379 _____
	380-399 _____	380-399 _____
	400 & up _____	400 & up _____
	Median _____	Median _____

Continued on back page ➡



Guardians of the 'Hood™ Game Statistics Sheet, Continued

Location: _____

Date Recorded: _____

Meter: _____

REMAINING STATISTICS SCREENS

<i>Session Time in Minutes</i>	<i>Segment at Which Player Quit</i>	<i>Who's the most popular — Wave 1</i>
0-2 _____	0 _____	Conner _____
3-5 _____	1 _____	Chief _____
6-8 _____	2 _____	Javier _____
9-11 _____	3 _____	Tanya _____
12-14 _____	4 _____	<i>Who's the most popular — Wave 2</i>
15-17 _____	5 _____	Conner _____
18-20 _____	6 _____	Chief _____
21-23 _____	7 _____	Javier _____
24-26 _____	8 _____	Tanya _____
27-29 _____	9 _____	Jay-Jay _____
30-32 _____	10 _____	<i>Who's the most popular — Wave 3</i>
33-35 _____	11 _____	Conner _____
37-38 _____	12 _____	Chief _____
39-41 _____	13 _____	Javier _____
42-44 _____	14+ _____	Tanya _____
45-47 _____	Median _____	Jay-Jay _____
48-50 _____		Boris _____
51-53 _____		<i>Who's the most popular — Wave 4</i>
54-57 _____		Conner _____
57 & up _____		Chief _____
Median _____		Javier _____
		Tanya _____
		Jay-Jay _____
		Boris _____
		Kwan _____

Warranty

Seller warrants that its printed-circuit boards and parts thereon are free from defects in material and workmanship under normal use and service for a period of ninety (90) days from date of shipment. Seller warrants that its video displays and laser-video disc players (in games supplied with displays and video-disc players) are free from defects in material and workmanship under normal use and service for a period of thirty (30) days from date of shipment. None of the Seller's other products or parts thereof are warranted.

If the products described in this manual fail to conform to this warranty, Seller's sole liability shall be, at its option, to repair, replace, or credit Buyer's account for such products which are returned to Seller during said warranty period, provided:

- (a) Seller is promptly notified in writing upon discovery by Buyer that said products are defective;
- (b) Such products are returned prepaid to Seller's plant; and
- (c) Seller's examination of said products discloses to Seller's satisfaction that such alleged defects existed and were not caused by accident, misuse, neglect, alteration, improper repair, installation, or improper testing.

In no event shall Seller be liable for loss of profits, loss of use, incidental or consequential damages.

Except for any express warranty set forth in a written contract between Seller and Buyer which contract supersedes the terms herein, this warranty is expressed in lieu of all other warranties expressed or implied, including the implied warranties of merchantability and fitness for a particular purpose, and of all other obligations or liabilities on the Seller's part, and it neither assumes nor authorizes any other person to assume for the Seller any other liabilities in connection with the sale of products by Seller.

The use of any non-Atari parts may void your warranty, according to the terms of the warranty. The use of any non-Atari parts may also adversely affect the safety of your game and cause injury to you and others. Be very cautious in using non-Atari-supplied components with our games, in order to ensure your safety.

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